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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,035	08/21/2003	Michael E. Ring	CRD 01482	7356

7590 11/28/2007

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EXAMINER	
ART UNIT	PAPER NUMBER

DATE MAILED: 11/28/2007

Please find below and/or attached an Office communication concerning this application or proceeding.

Notification of Non-Compliant Appeal Brief (37 CFR 41.37)	Application No. 10/645,035	Applicant(s) RING ET AL.	
	Examiner Melody M. Burch	Art Unit 3683	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The Appeal Brief filed on *19 July 2007* is defective for failure to comply with one or more provisions of 37 CFR 41.37.

To avoid dismissal of the appeal, applicant must file anamended brief or other appropriate correction (see MPEP 1205.03) within **ONE MONTH or THIRTY DAYS** from the mailing date of this Notification, whichever is longer. **EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136.**

1. ☐ The brief does not contain the items required under 37 CFR 41.37(c), or the items are not under the proper heading or in the proper order.

2. ☐ The brief does not contain a statement of the status of all claims, (e.g., rejected, allowed, withdrawn, objected to, canceled), or does not identify the appealed claims (37 CFR 41.37(c)(1)(iii)).

3. ☐ At least one amendment has been filed subsequent to the final rejection, and the brief does not contain a statement of the status of each such amendment (37 CFR 41.37(c)(1)(iv)).

4. ☒ (a) The brief does not contain a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number and to the drawings, if any, by reference characters; and/or (b) the brief fails to: (1) identify, for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function under 35 U.S.C. 112, sixth paragraph, and/or (2) set forth the structure, material, or acts described in the specification as corresponding to each claimed function with reference to the specification by page and line number, and to the drawings, if any, by reference characters (37 CFR 41.37(c)(1)(v)).

5. ☐ The brief does not contain a concise statement of each ground of rejection presented for review (37 CFR 41.37(c)(1)(vi))

6. ☐ The brief does not present an argument under a separate heading for each ground of rejection on appeal (37 CFR 41.37(c)(1)(vii)).

7: ☐ The brief does not contain a correct copy of the appealed claims as an appendix thereto (37 CFR 41.37(c)(1)(viii)).

8. ☒ The brief does not contain copies of the evidence submitted under 37 CFR 1.130, 1.131, or 1.132 or of any other evidence entered by the examiner **and relied upon by appellant in the appeal**, along with a statement setting forth where in the record that evidence was entered by the examiner, as an appendix thereto (37 CFR 41.37(c)(1)(ix)).

9. ☒ The brief does not contain copies of the decisions rendered by a court or the Board in the proceeding identified in the Related Appeals and Interferences section of the brief as an appendix thereto (37 CFR 41.37(c)(1)(x)).

10. ☒ Other (including any explanation in support of the above items):

With respect to box 4, Examiner notes that the brief fails to contain a concise explanation of the subject matter of each independent claim involved in the appeal. Instead, Appellant provides a lengthy section including details of dependent claims in addition to the independent claim descriptions. With respect to boxes 8 and 9, Examiner notes that Appellant failed to include the Evidence appendix and the Related proceedings appendix as required. Additionally, Examiner notes that the brief includes drawing objection arguments that are not appealable to the board but instead are petitionable to the Director. Also, the claims section of the brief should have the heading "Claims appendix".

Melody M. Burch

Melody M. Burch
Primary Examiner
Art Unit 3683

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES

In re application of:	)	Group Art Unit: 3683
	)	
Michael E. Ring et al.	)	Examiner: Burch, Melody M.
	)	
Serial No.: 10/645,035	)	Attorney Docket: CRD 01482
	)	
Filed: August 21, 2003	)	Date: December 26, 2007

For: UNIVERSAL BRAKE ASSEMBLY

COMMISSIONER FOR PATENTS
P.O. BOX 1450
ALEXANDRIA, VA 22313

JAMES O. RAY

FOR

APPELLANT

Sir:

The following appeal brief for Appellant under Rule 1.192 is submitted pursuant to the Notice of Appeal and Request for Oral Hearing filed on January 29, 2007 in the above-identified application and revised to comply with the requirements of the Notification of Non-Compliant Appeal Brief mailed on November 28, 2007. Sections 2 and 10 now contain reference and copies of the related decisions rendered by the court. Section 5 now contains concise explanation of independent claims and provides structure for every means plus function in each independent claim and each dependent claim argued separately. Section 9 contains copies of evidence entered by the Examiner.

(1) Real Party in Interest

The real part in interest of the present application is Westinghouse Airbrake Technology Corporation.

(2) Related Appeals and Interferences

1. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)
2. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).
3. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).
4. *In re Antonie*, 559 F.2d 618, 620, 195 USPQ 6,8 (CCPA 1977).
5. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

(3) Status of Claims

Claims 1-13 and 16-21 are currently pending in this application. Claims 14-15 are canceled. Claims 1-9, 11-13 and 16-21 are finally rejected and claim 10 is objected to as per the Office Action dated October 30, 2006. Claims 1-13 and 16-21 are on appeal.

(4) Status of Amendments

A telephonic interview between Examiner and Applicant's representative was held on August 7, 2006 and an amendment

incorporating the subject matter discussed during the interview was filed on August 14, 2006. In the Interview Summary dated August 14, 2007, Examiner indicated that "proposed amendment appeared to overcome the Ring reference. However, the amendment did not result in allowance of the claims as the Examiner stated in the Office Action dated October 30, 2007 that "Applicant's arguments with respect to the claims have been considered but are moot in view of the new grounds of rejection."

(5) Summary of claimed subject matter

Claim:

1. An actuating member 60 for a railway vehicle brake assembly 10, having an air bag actuator 50 incorporated therein, includes:

(a) a first substantially vertically disposed plate like member 66 having a first substantially planar surface; **(Page 12, line 14)**

(b) a substantially horizontally disposed plate like member 64 connected to the first substantially vertically disposed plate like member 66 adjacent a bottom edge thereof and extending substantially perpendicular to the first substantially planar surface of the first substantially vertically disposed plate like member 66; and **(Page 14, lines 12-15)**

(c) a means, such as at least one cavity 74 provided in at least one force transfer lever engaging portion 72, for securing the actuating member 60 to a control linkage 14 of such railway vehicle brake assembly 10. **(Page 14, lines 9-11)**

6. An apparatus 80 for mounting an air bag actuator 50 to at least one brake beam includes:

(a) a first substantially vertically disposed plate like member 82 having a planar surface portion for engagement with a substantially planar surface portion of a second substantially vertically disposed plate like member 56 connected to such air bag actuator 50; **(Page 12, line 24)**

(b) a guide means, such as first edge portion 84, for guiding and alignment during reciprocal motion of such air bag actuator 50; and **(Page 14, lines 15-21)**

(c) a securing means, such as cavities 98 and a support portion 100, for enabling attachment of the apparatus 80 to a rigid structure. **(Page 13, lines 3-11)**

9. An air spring actuator assembly 50 includes: **(Page 12, lines 5-6)**

(a) at least one air bag spring 52; **(Page 12, lines 8-11)**

(b) a first substantially vertically disposed plate like member 66 having a first substantially planar surface engageable

with a first surface of a second substantially vertically disposed plate like member 54 attached to the at least one air bag spring 52; **(Page 12, lines 11-14)**

(c) a substantially horizontally disposed plate like member 64 connected to the first substantially vertically disposed plate like member 66 adjacent a bottom edge thereof and extending substantially perpendicular to the first substantially planar surface of the first substantially vertically disposed plate like member 66; **(Page 14, lines 12-15)**

(d) a means, such as a push rod and a shield member 72 (ref dependent claim 10), for securing the first substantially vertically disposed plate like member 66 to a control linkage 14 of a railway vehicle brake assembly 10; **(Page 14, lines 9-11)**

(e) a third substantially vertically disposed plate like member 82 having a second planar surface portion for engagement with a substantially planar surface portion of a fourth substantially vertically disposed plate like member 56 connected to the at least one air bag spring 52; **(Page 12, lines 20-24)**

(f) a guide means, such as first edge portion 70 and engaging first edge portion 84, for guiding and alignment during reciprocal motion of such air bag spring 52; and **(Page 14, lines 15-21)**

(g) a securing means, such as cavities 98 and a support portion 100, for enabling attachment of the air spring actuator assembly 50 to a rigid structure. **(Page 13, lines 3-11)**

11. An air spring actuator assembly 50, according to claim 9, further including means, such as stop portion 77 of pushrod/shield 60 engaging a third edge portion 86 of the mounting bracket 80, for limiting reciprocal motion of the air spring actuator 50 during evacuation of air pressure from the at least one air bag spring. **(Page 15, lines 15-19)**

12. An air spring actuator assembly 50, according to claim 11, wherein the means for limiting reciprocal motion of the brake actuator is a stop portion 77 disposed internally within the air spring actuator. **(Page 15, lines 19-21)**

19. In a railway car mounted brake assembly 10 including a pair of brake beams 2, 3, each of such brake beams 2, 3 having a control linkage pivotally attached thereto 14, 16, and a pair of force transmitting members 28 and 32 attached thereto: the improvement comprising an air spring actuator 50 for applying and releasing such brake beams 2, 3, the air spring actuator 50 comprising: **(Page 9, lines 16-26 and page 10 lines 1-15)**

(a) a first substantially vertically disposed plate like member 66 having a first substantially planar surface and a means, such as at least one cavity 74 provided in at least one force transfer lever engaging portion 72, connected to the first substantially vertically disposed plate like member 66 for securing the air spring actuator 50 to such second control linkage; **(Page 14, lines 9-11)**

(b) a second substantially vertically disposed plate like member 82 having a second substantially planar surface and a means, such as cavities 98 and a support portion 100 connected to the second substantially vertically disposed plate like member 82 for securing the air spring actuator 50 to one of such brake beam 2, such second force transmitting member 32 and a combination thereof; and **(Page 12, lines 20-24)**

(c) at least one inflatable air bag spring 52, whereby selective inflation and deflation of the at least one inflatable air bag spring 52 in a longitudinal direction enables a reciprocal motion thereof to move such control linkages 14, 16 and such force transmitting members 28, 32 for actuating and deactuating such brake beams 2, 3, wherein an exterior surface of the at least one inflatable air bag spring 52 is at least partially exposed within such railway car mounted brake assembly 10 to an atmosphere when such railway car mounted brake assembly 10 is in use. **(Page 12, lines 8-14)**

20. The improvement according to claim 19, wherein the air spring actuator 50 includes means, such as second surface portion 64, for shielding at least a portion of the at least one inflatable air bag spring 52 from detrimental extraneous foreign material. **(Page 14, lines 12-15)**

21. The improvement according to claim 19, wherein the air spring actuator 50 includes means, such as first edge portion 70 and second edge portion 78 engaging first edge portion 84 and second edge portion 94 respectively, for guiding and alignment thereof during the reciprocal motion of the at least one inflatable air bag spring 52. **(Page 14, lines 15-21).**

(6) Grounds of rejection to be reviewed on appeal

Whether claims 1,2,5,6,9,11,12,13, and 18 are unpatentable under 35 U.S.C. 102(b) as being anticipated by US Patent 4711464 to Bilas.

Whether claims 1-9 and 13 are unpatentable under 35 U.S.C. 102(b) as being anticipated by US Patent 2879077 to Chalmers.

Whether claims 1,2,5,6,9,11, 12, 13, and 18 are unpatentable under 35 U.S.C. 103(a) over US Patent 4711464 to Bilas in view of US Patent 6142480 to Streitman et al.

Whether claims 1-9 and 13 are unpatentable under 35 U.S.C. 103(a) over US Patent 2879077 to Chalmers in view of US Patent 6142480 to Streitman et al.

Whether claims 16 and 17 are unpatentable under 35 U.S.C. 103(a) over Bilas in view of Streitman et al. as applied to claim 9 above, and further in view of US Patent 4846785 to Cassou et al.

Whether claims 19, 20, and 21 are unpatentable under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Bilas.

Whether claims 19-21 are unpatentable under 35 U.S.C. 103(a) over Admitted prior art in view of US Patent 4711464 to Bilas and further in view of US Patent 6142480 to Streitman et al.

Whether claims 19, 20, and 21 are unpatentable under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Chalmers.

Whether claims 19-21 are unpatentable under 35 U.S.C. 103(a) over Admitted prior art in view of Chalmers and further in view of US Patent 6142480 to Streitman et al.

(7) Argument

Due to the multiplicity of rejections, a discussion of the background of the invention and a summary of the invention appear below first.

I. Background of the Invention

Truck mounted braking systems have been in widespread use on railway cars for many years prior to the present invention. These systems comprise a series of force transmitting members, levers and linkages which function to move a group of brake shoes against the wheels of a railway vehicle to effect stoppage of such railway vehicle. A pneumatically activated brake cylinder is typically provided in the braking system to initiate movement of this series of force transmitting members, levers and linkages to apply the brakes of the railway vehicle mounted to a truck assembly of said railway vehicle.

A well known type of truck mounted braking system is a TMX.RTM. truck mounted braking system (TMX.RTM. is a registered trademark to Westinghouse Airbrake Technology Corporation, the assignee of the present invention). A currently used pneumatically activated brake cylinder for truck mounted braking systems generally comprises of an air cylinder piston which moves in a forwardly direction within a cylindrical member upon the application of pneumatic pressure thereto. A seal and/or diaphragm is provided on or adjacent a first end of the piston.

Whether claims 1-9 and 13 are unpatentable under 35 U.S.C. 103(a) over US Patent 2879077 to Chalmers in view of US Patent 6142480 to Streitman et al.

Whether claims 16 and 17 are unpatentable under 35 U.S.C. 103(a) over Bilas in view of Streitman et al. as applied to claim 9 above, and further in view of US Patent 4846785 to Cassou et al.

Whether claims 19, 20, and 21 are unpatentable under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Bilas.

Whether claims 19-21 are unpatentable under 35 U.S.C. 103(a) over Admitted prior art in view of US Patent 4711464 to Bilas and further in view of US Patent 6142480 to Streitman et al.

Whether claims 19, 20, and 21 are unpatentable under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Chalmers.

Whether claims 19-21 are unpatentable under 35 U.S.C. 103(a) over Admitted prior art in view of Chalmers and further in view of US Patent 6142480 to Streitman et al.

This seal and/or diaphragm contacts the inner surface of the cylindrical member so as to provide an airtight chamber at one end of the cylindrical member such that application of pneumatic pressure therein and against the first end of the piston enables forward movement of the piston. A piston rod is attached at a second end of the piston and moves in response to the movement of the piston. An opposite end of the piston rod is connected to the end of a push rod which is, in turn, connected to a cylinder force transfer lever. This cylinder force transfer lever is connected through a series of force transmitting members and linkages so as to activate a braking sequence and apply the brake shoes to the vehicle wheels.

A disadvantage of this type of pneumatically activated brake cylinder is that due to regulations regarding the amount of air pressure which must be supplied into the brake cylinder, it is sometimes difficult to control the movement and/or force applied by the piston. Some countries require that a certain amount of pressure, such as at least 1-1.15 bar greater than atmosphere, be applied within the brake cylinder. During light load conditions, too much force applied by the piston can cause the brake shoe forces to be greater than necessary resulting in wheel skid.

Another disadvantage is that care must be taken in the maintenance of the seals and/or diaphragms within the

cylindrical member to ensure that leaking of air does not occur, resulting in a loss of pressure and a reduced amount of force being applied by the piston/piston rod assembly. Also, when cracking and/or deterioration of the seals and/or diaphragms does occur, the air brake cylinder must be completely disassembled in order to repair or replace the defective components. The difficulty in determining the condition of the components lies in that the components are contained within the cylindrical member thus resulting in a need for disassembly for inspection purposes.

An additional disadvantage of the currently used air brake cylinders is their inability to accommodate piston bail or misalignment without leaking air. In addition, it is impractical to visually determine the proper relationship between the actual stroke of the cylinder and the brake shoe force during braking.

United States Patent 6,116,385, Dual Force Range TMX Cylinder Using an Airspring Actuator teaches a pneumatically activated brake cylinder which comprises a cylindrical casing engaged with a railway vehicle braking system. A hollow piston assembly having a first surface and an opposed second surface is mounted for reciprocal movement within the cylindrical casing. There is at least one air spring actuator engageable with the first surface of the hollow piston assembly and an opposed inner

surface of such cylindrical casing. An air communication means is in fluid communication with an interior portion of the at least one air spring actuator for allowing the application and removal of air from the air spring actuator during a brake application or a brake release, and a piston rod assembly is associated with the opposed second end of the hollow piston assembly. This piston rod assembly is capable of movement in an outward direction from the cylindrical casing upon actuation of the air spring actuator to initiate a braking sequence for the railway vehicle braking system. The air communication means comprises an air inlet means which is provided in the cylindrical casing and the air spring actuator to enable application of pneumatic pressure within the air spring to form a first air cavity.

A packing cup is provided on the hollow piston assembly producing a seal between the hollow piston assembly and the inner surface of the cylindrical member to form a second air cavity. An air inlet flange is also provided on the cylindrical member to enable the application into and the evacuation of air from the second cavity.

The teaching of United States Patent 6,116,385, Dual Force Range TMX Cylinder Using an Airspring Actuator is incorporated herein by reference thereto.

Although the TMX.RTM braking system offers improved performance of the airbrake cylinder in certain applications, there is a need for a simpler device having less components.

II. Instant Invention

The present invention comprises an improved truck-mounted brake assembly, generally designated 10, for a railway car (not shown). This brake assembly 10 comprises brake beams, generally designated 2 and 3, which are substantially identical. Each of the brake beams 2 and 3 includes a compression member 4, a tension member 6 and a strut member 8. The opposite ends of the compression member 4 and the tension member 6 may be permanently connected together, preferably by welding, along an outer segment (not shown) at the opposite ends of the compression member 4 and the tension member 6. See page 9, lines 16-26.

At a location substantially midway between their opposite ends, the compression member 4 and the tension member 6 of the, respective, brake beams 2 and 3 are spaced apart sufficiently to allow connection of the strut member 8 therebetween. Mounted on the respective outer end segments of the brake beams 2 and 3 are brake heads 12. See page 10, lines 1-6.

A pair of force-transfer levers 14 and 16 are pivotally connected by pins 18 to the strut member 8 of the respective brake beams 2 and 3. One end of the respective force-transfer levers 14 and 16 is interconnected via a force-transmitting

member 28, which may be in the form of a slack adjuster device. The opposed end 36 of the force-transfer lever 16 is connected to an at least one brake actuator assembly 40 by connecting means 31 via a force-transmitting member or a return push rod assembly 32. See page 10, lines 7-15.

In further reference to Figs. 1 and 2 when a brake application is made, pressurization of the air spring actuator, generally designated 50, will result in movement of pushrod/shield, generally designated 60, connected with force transfer lever 14 in a forward direction to effect a counterclockwise rotation of said force transfer lever 14. The force transfer lever 14, in turn, actuates the slack adjuster assembly 28 to effect counterclockwise rotation of the force-transfer lever 16 and consequent actuation of the return push rod assembly 32. See page 10, lines 16-23 and page 11, lines 1-2.

The force-transfer levers 14 and 16, along with the slack adjuster assembly 28, the return push rod assembly 32 and the brake actuator assembly 40 comprise a brake beam actuating linkage that interconnects the, respective, brake beams 2 and 3 via the pivot pins 18 and thus the required brake actuation forces effectively act along these pivot pins 18. The resultant of these forces is shown at X. Because the slack adjuster assembly 28 acts as a rigid member during a brake application,

it is important that the length of the slack adjuster assembly 28 be allowed to increase with brake shoe wear and/or loss of a brake shoe during service so that movement of the pushrod/shield 60 will enable such brake beams 2 and 3 to be moved apart by the brake beams linkage until brake shoe engagement with the tread surface of the vehicle wheels occurs. See page 11, lines 3-16.

Any well-known technique may be used to position and/or mount the brake actuator assembly 40 to the braking system. For example, such brake actuator assembly 40 can be connected to both the strut member 8, adjacent one side thereof, and to the compression member 4 in the space located between the compression member 4 and the tension member 6. In this particular arrangement, the weight of the brake actuator assembly 40 and the force-transmitting members is carried by the brake beams 2 and 3, which are, in turn, supported by the truck side frames (not shown). A connecting means 31 is provided for connecting a back portion of the mounting member with the return push rod 32. See page 11, lines 17-24 and page 12, lines 1-4.

In reference to FIG. 3 brake actuator assembly 40 consists of at least one air spring actuator 50 disposed within pushrod/shield member 60 and a mounting bracket member, generally designated 80. At least one air spring 52 is substantially attached to a first surface 54 and an opposed

second surface 56 substantially coplanar to said first surface 54. A pushrod/shied 60 is connected to the first surface 54 of the air spring 52 wherein at least one mounting member 58 will cooperate with at least one mounting cavity 68 disposed within first surface 66 of said pushrod/shield 60. See page 12, lines 5-14.

In the presently preferred embodiment this at least one mounting member 58 and at least one mounting cavity 68 are four mounting members 58 and four mounting cavities 68 respectively. This pushrod/shield 60 is capable of movement in an outward direction upon actuation of the air spring 52 to initiate a braking sequence of the railway vehicle braking system. A mounting bracket 80 is connected to the opposed second surface 56 of the air spring 52 wherein at least one mounting member 58 cooperates with an at least one mounting cavity 88 disposed within surface 82 of the mounting bracket 80. In the presently preferred embodiment there are four mounting members 58 and four mounting cavities 88 respectively. See page 12, lines 15-24 and page 13, lines 1-2.

In further reference to FIG. 2, at least one cavity 98 is provided for attachment of such mounting bracket 80 to the compression member 4. In the presently preferred embodiment there are two cavities 98. Furthermore, a support portion 100 substantially engages strut member 8 having tab member 102 and

at least one mounting cavity 104 for attachment to such strut member 8 is provided to substantially minimize force loads acting on the brake actuator 40 upon actuation of the hand brake mechanism (not shown). See page 13, lines 3-11.

The air spring 52 includes air communication means 41, best shown in FIG. 2, in fluid communication with an interior portion of at least one air spring 52 for supplying air pressure to such at least one air spring 52 to cause actuation of this air spring 52 during a brake application and also for removing or evacuating air from the air spring 52 to cause deactivation of the air spring 52 during a brake release. In the presently preferred embodiment, this air communication means 41 is at least one air inlet port. Cavity 97 disposed within the mounting bracket is substantially aligned with the air communication means 41 to enable application of the pneumatic pressure within air spring 52. Forces generated upon pressurization of the air spring 52 vary with the respect to their travel height due to the natural characteristics of the rubber. The pressurization and discharge of the air spring actuator is regulated by an external control circuit (not shown). Furthermore, these forces vary at the constant pressure applied to the air spring 52. See page 13, lines 12-24 and page 14, lines 1-4.

Any commercially available inflatable spring may be used as long as this spring is capable of withstanding the amount of air

pressure applied thereto and capable of providing sufficient force to move pushrod/shield 60 to initiate a braking sequence. See page 14, lines 5-8.

At least one cavity 74 is provided in at least one force transfer lever engaging portion 72 of such pushrod/shield 60 for connection with force-transfer levers 14 and 16 by pins 19. In further reference to FIG. 3, pushrod/shield 60 having second and third surface portions 64 and 76 substantially horizontal to first surface portion 66 protects air spring actuator 50 from foreign objects during railway vehicle movement. First edge portion 70 and second edge portion 78 engage first edge portion 84 and second edge portion 94 respectively of the mounting bracket 80 for guiding the air spring actuator 50 during reciprocal movement of such air spring actuator 50 to provide for linkage bail and/or misalignment without applying loads to the air spring actuator 50. See page 14, lines 9-21.

In the presently preferred embodiment, edge portions 70, 78, 84 and 94 are simple edge portions produced by either a casting or forging method. Alternatively, at least one wear resistant member 96 of predetermined material is attached to such edge portions 84 and 94, as shown in FIG. 4, to substantially minimize damage to edge surfaces 70 and 78 during railway vehicle motion. Yet alternatively, damage to edge surfaces 70 and 78 is substantially minimized by such simple

edge portions 84 and 94 having second surface portions 85 and 95 substantially perpendicular to the edge surfaces 84 and 94 respectively as shown in FIG. 5. See page 14, lines 22-24 and page 15, lines 1-8.

In further reference to FIG. 3, a linear travel height indicator 92 is attached to surface portion 90 of the mounting bracket 80 permitting determination of the forces generated upon pressurization of the air spring 52 that vary with respect to their travel height due to the natural characteristics of the rubber. See page 15, lines 9-14.

In the preferred embodiment, upon discharge of the spring actuator 50, stop portion 77 of pushrod/shield 60 will engage a third edge portion 86 of the mounting bracket 80 preventing further motion of the spring actuator 50 and, more particularly, preventing damage to air spring 52. Alternatively, stop 77 can be incorporated and disposed internally within air spring 52 having substantially identical functionality as edge portion 86. See page 15, lines 15-21.

Furthermore, it is preferred that edge portion 86 be produced by a casting or forging process. Alternatively, at least one wear resistant member 93 of predetermined material is attached to edge portion 86 to substantially minimize damage to edge surface 77 during railway vehicle motion. Yet alternatively, damage is substantially minimized with edge

portion 86 having an adjoining surface portion 87 substantially perpendicular to said edge portion 86. See page 15, lines 22-24 and page 16, lines 1-5.

Currently used brake cylinder assemblies may be retrofitted with the air spring actuator assembly of the present invention by substantially replacing the cylinder assembly with the air spring actuator assembly having a predetermined push rod/shield and mounting bracket arrangements to interface with the existing brake assembly arrangement. See page 16, lines 6-11.

(7.1) Rejection under 35 U.S.C. 102(b) over US Patent 4711464 to Bilas.

Claims 1, 2, 5, 6, 9, 11, 12, 13, and 18

Appellant respectfully disagrees with the Examiner's rejections for the following reasons.

Claim 1

The Examiner's contention that Claim 1 is unpatentable under 35 U.S.C. 102(b) as being anticipated by Bilas (US Patent 4711464) is not believed to be well founded. It is the Examiner's position that Bilas anticipates every single element of the present invention.

A. Examiner's rejections

The Examiner contends that regarding claim 1, Bilas shows in figure 1 an actuating member capable of being used for a

railway vehicle brake assembly, such vehicle brake assembly having an air bag actuator 10 incorporated therein, said actuating member comprising: a first substantially vertically disposed plate like member or right side of element 14, said first substantially vertically disposed plate like having a first substantially planar surface shown near the lead line of 14 engageable with a first surface of a second substantially vertically disposed plate like member or right side wall 11 attached to such air bag actuator, a substantially horizontally disposed plate like member 22 connected to the first substantially vertically disposed plate like member adjacent a bottom edge thereof and extending substantially perpendicular to the first planar surface of the first vertically disposed plate member for shielding at least a first portion (or particularly the bottom portion) of the air bag actuator from foreign material as shown, and a means 15 connected to a radially opposed second surface of the first vertically disposed plate like member via intervening elements such as element 13 for securing the actuating member to a control linkage of the assembly.

B. Response to Rejections

In the rejection, Examiner asserted that "right side of element 14 is a first substantially vertically disposed plate like member" and that "the first substantially vertically

disposed plate like has a first substantially planar surface shown near the lead line of 14".

Examiner's attention is directed to column 1 lines 65-68 wherein Bilas teaches "An adjustable chamber reduction partition 13 is movably positioned within the housing 10 adjacent the closure plate 12 and has a down turned annular guide lip 14 extending from its perimeter edge ...". Further in column 2 lines 18-21, Bilas teaches "The air spring 19 is positioned on a movable head plate 22 having an outer diameter slightly less than that of said interior of said housing 10 as defined by said side wall 11".

It is clear that since Bilas teaches a housing 10 having a round cross-section and further teaches an annular guide lip (ring) 14, Bilas does not anticipate or suggests "first substantially vertically disposed plate like member having a first substantially planar surface" since an annular ring is not a plate like member and does not have a substantially planar surface. Appellant notes that annular ring cannot have a "right side" as understood by the Examiner.

Therefore, Bilas prior art reference does not anticipate each and every limitation of the present invention of the independent claim 1.

Claim 2

A. Examiner's rejections

The Examiner contends that regarding claim 2, Bilas shows in figure 1 wherein the actuating member further includes a first plate like member left side of element 14 connected to an upper surface of the substantially horizontally disposed member via intervening elements and to the first planar surface of the first substantially vertically disposed plate like member adjacent a first side edge thereof and extending substantially perpendicularly to at least the substantially horizontally disposed member for shielding at least a second portion (or top left portion) of such air bag actuator from the detrimental extraneous foreign material and for providing added strength between the first substantially vertically disposed member and the substantially horizontally disposed member.

B. Response to Rejections

Since Appellant stipulated above that element 14 of Bilas is an annular ring, such ring cannot include a plate like member of "left side of element 14" as asserted by the Examiner.

Therefore, Bilas prior art reference does not anticipate each and every limitation of the present invention of the dependent claim 2.

Claim 5

A. Examiner's rejections

The Examiner contends that regarding claim 5, Bilas shows in figure 1 the means including at least one plate member 16 having an aperture formed therethrough and a pin member 15 disposed in the aperture for securing the at least one plate member to such control linkage.

B. Response to Rejections

Appellant respectfully disagrees with the Examiner's rejections for the following reasons.

Regarding claim 1, the Examiner erroneously asserted that element 14 of Bilas anticipates the first substantially vertically disposed plate like member of the present invention. Following the logic of the Examiner's assertion, the element 16 of Bilas must be then connected to its element 14. However, Bilas clearly shows in Figure 1, that the element 16 is connected to the closure plate 12 of the housing 10 and not to the member 14. Furthermore, Billas discloses in column 2 lines 3-4 that element 16 is a "threaded drive fitting" which, Appellant asserts, is not a plate member 72 of the present invention of claim 5. Additionally, Bilas clearly shows in FIG. 4 that fitting 16 and pin 15 are not connected to any control linkage.

Therefore, Bilas prior art reference does not anticipate each and every limitation of the present invention of the dependent claim 5.

Claim 6

The Examiner's contention that Claim 6 ia unpatentable under 35 U.S.C. 102(b) as being anticipated by Bilas (US Patent 4711464) is not believed to be well founded. It is the Examiner's position that Bilas anticipates every single element of the present invention of independent claim 6.

A. Examiner's rejections

The Examiner contends that regarding claim 6, "Bilas shows in figure 1 an apparatus for mounting an air bag actuator to at least one brake beam, the air bag actuator having at least one inflatable air bag spring 19, the apparatus comprising: a first substantially vertically disposed plate like member or right side of element 14 having a planar surface portion for engagement with a substantially planar surface portion of a second substantially vertically disposed plate like member or right side of element 11 connected to such air bag actuator, the first substantially vertically disposed plate like member exposing at least a first portion of an exterior surface of such at least one inflatable air bag spring to an atmospheric operating environment by way of its cooperation with element 14

which has an aperture communicating with aperture 17 exposed to atmosphere characterized by a presence of detrimental extraneous foreign when such car mounted brake assembly is in use, a guide means 13 directly connected to and disposed closely adjacent a first outer edge of and substantially perpendicular to the planar surface portion of the first substantially vertically disposed plate like member for guiding and alignment during reciprocal motion of such air bag actuator and a securing means 15 connected to the first substantially vertically disposed plate like member via intervening element such as element 13 for enabling attachment of the apparatus to a rigid structure".

B. Response to Rejections

Appellant respectfully disagrees with the Examiner's rejections for the same reason that the annular guide lip (ring) 14 is not a plate like member and cannot have substantially planar surface. Furthermore, Bilas specifically recites that element 14 and not element 13 is a "guide means". Therefore, the assertion by the Examiner that Bilas teaches "guide means 13" is a mere allegation.

Therefore, Bilas prior art reference does not anticipate each and every limitation of the present invention of the dependent claim 6.

Claim 9

The Examiner's contention that Claim 9 is unpatentable under 35 U.S.C. 102(b) as being anticipated by Bilas (US Patent 4711464) is not believed to be well founded. It is the Examiner's position that Bilas anticipates every single element of the present invention of independent claim 9.

A. Examiner's rejections

The Examiner contends that regarding claim 9, "Bilas shows in figure 1 an air spring actuator assembly, the air spring actuator assembly comprising: at least one air bag spring 19 having at least a first portion of an exterior surface exposed to an atmospheric operating environment via apertures 17 and 18 characterized by a presence of detrimental extraneous foreign material during use of the air spring actuator assembly, a first substantially vertically disposed plate like member or right side of element 14, the first substantially vertically disposed plate like member having a first substantially planar surface engageable with a first surface of a second substantially vertically disposed plate like member or right side of element 11 attached to the at last one air bag spring, a substantially horizontally, disposed plate like member 22 connected to the first substantially vertically disposed plate like member adjacent a bottom edge thereof and extending substantially perpendicular to the first substantially planar surface of the

first substantially vertically disposed plate like member for shielding the at least said first portion of the exterior surface of the at least one air bag spring from the detrimental extraneous foreign material, a means 15 connected via intervening elements to a radially opposed second surface of the first substantially vertically disposed plate like member for securing the first substantially vertically disposed plate like member to a control linkage of a railway vehicle brake assembly, a third substantially vertically disposed plate like member or left side of element 14 having a second planar surface portion for engagement with a substantially planar surface portion of a fourth substantially vertically disposed plate like member or right side of element 11 connected to the at least one air bag spring, a guide means 13 connected to and disposed closely adjacent a first outer edge of and substantially perpendicular to at least one of the first substantially planar surface and the second planar surface portion of a respective one of the first and the third substantially vertically disposed plate like member for guiding and alignment during reciprocal motion of the air bag spring and a securing means connected to the third substantially vertically disposed plate like member for enabling attachment of the air spring actuator assembly to a rigid structure"

B. Response to Rejections

Examiner's attention is directed to column 1 lines 65-68 wherein Bilas teaches "An adjustable chamber reduction partition 13 is movably positioned within the housing 10 adjacent the closure plate 12 and has a down turned annular guide lip 14 extending from its perimeter edge ...". Further in column 2 lines 18-21, Bilas teaches "The air spring 19 is positioned on a movable head plate 22 having an outer diameter slightly less than that of said interior of said housing 10 as defined by said side wall 11".

It is clear that Bilas teaches a housing 10 having a round cross-section and further teaches an annular guide lip (ring) 14. Therefore, annular guide lip 14 does not anticipate or suggests "plate like member having a substantially planar surface" as asserted by the Examiner. The Appellant notes that annular guide lip (ring) cannot have a "right side" as understood by the Examiner. Equally as well, the element 14 cannot be a plate like member as asserted by the Examiner.

The Examiner further stated that "a substantially horizontally disposed plate like member 22 connected to the first substantially vertically disposed plate like member adjacent a bottom edge thereof". Bilas does not show that element 22 is connected to element 14 adjacent a bottom edge thereof.

Additionally Examiner understood that element 13 functions as a guide means. Bilas specifically recites that its element 14 is a "guide lip"

Therefore, Bilas prior art reference does not anticipate each and every limitation of the present invention of the dependent claim 9.

Claim 11

The Examiner's contention that Claim 11 is unpatentable under 35 U.S.C. 102(b) as being anticipated by Bilas (US Patent 4711464) is not believed to be well founded. It is the Examiner's position that Bilas anticipates every single element of the present invention of independent claim 11.

A. Examiner's rejections

Examiner contends that Bilas shows in figure 1 the means for limiting reciprocal motion being in the form of element 26.

B. Response to Rejections

Claim 11 of the present invention specifically recites "means disposed therein for limiting reciprocal motion of said air spring actuator during evacuation of air pressure from said at least one air bag spring."

Element 26 of Bias is a coiled spring which is compressed as air springs 19 fill (see column 2, lines 61-64 in Bilas). When air is evacuated from air spring 19, the coiled spring 26

extends but does not limit the reciprocal motion of the air spring 19.

Therefore, Bilas prior art reference does not anticipate each and every limitation of the present invention of the dependent claim 11.

Claim 12

The Examiner's contention that Claim 12 is unpatentable under 35 U.S.C. 102(b) as being anticipated by Bilas (US Patent 4711464) is not believed to be well founded. It is the Examiner's position that Bilas anticipates every single element of the present invention of independent claim 12.

A. Examiner's rejections

Examiner contends that Bilas shows in figure 1 the means for limiting reciprocal motion being in the form of element 24.

B. Response to Rejections

Appellant assert that element 24 has no effect on controlling reciprocal motion of the air spring actuator during evacuation of air from air spring 19.

Therefore, Bilas prior art reference does not anticipate each and every limitation of the present invention of the dependent claim 12.

Claims 13 and 18

Group dependent claims 13 and 18 stand or fall with the independent claim 9.

In view of the forgoing arguments, it is requested that the final rejection of claims 1,2,5,6,9,11,12,13, and 18 under 35 U.S.C. 102(b) as being anticipated by US Patent 4711464 to Bilas be reversed, as this prior art patent clearly fails to disclose each and every limitation.

(7.2) Rejection under 35 U.S.C. 102(b) over US Patent 2879077 to Chalmers

Claims 1-9 and 13

Appellant respectfully disagrees with the Examiner's rejections for the following reasons.

Claim 1

The Examiner's contention that Claim 1 is unpatentable under 35 U.S.C. 102(b) as being anticipated by Chalmers (US Patent 2879077) is not believed to be well founded. It is the Examiner's position that Chalmers anticipates every single element of the present invention.

A. Examiner's rejections

The Examiner contends that regarding claim 1, Chalmers shows in figure 1 an actuating member capable of being used for

a railway vehicle brake assembly, such vehicle brake assembly having an air bag actuator shown in the area of element 12 incorporated therein, said actuating member comprising: a first substantially vertically disposed plate like member 10, said first substantially vertically disposed plate like having a first substantially planar surface engageable with a first surface of a second substantially vertically disposed plate like member 14 attached to such air bag actuator, a substantially horizontally disposed plate like member 50 connected to the first substantially vertically disposed plate like member adjacent a bottom edge thereof and extending substantially perpendicular to the first planar surface of the first vertically disposed plate member for shielding at least a first portion of the air bag actuator from foreign material as shown, and a means or aperture within element 10 (in an alternate interpretation see element 36) connected to a radially opposed second surface of the first vertically disposed plate like member for securing the actuating member to a control linkage 32 or 52 in another interpretation of the assembly".

B. Response to Rejections

The Examiner's attention is directed to column 2 lines 35 and FIG. 8, wherein Chalmers discloses and shows a "beam 10". Such beam 10 is formed by a U-shaped member which is horizontally disposed and a plurality of stiffener plates which

are vertically disposed. Therefore, the Examiner's assertion that beam 10 of Chalmers anticipates plate like member 66 of the present invention is believed to be in error.

Regarding the Examiner's assertion that element 50 of Chalmers anticipates the horizontally disposed element 64 of the present invention, the Examiner's attention is directed to Figures 1, wherein Chalmers shows that such element 50 is vertically disposed and further that such element 50 is a tubular member and, therefore, Examiner's assertion that member 50 of Chalmers anticipates horizontally disposed plate like member 64 of the present invention is believed to be in error.

Therefore, Chalmers prior art reference does not anticipate each and every limitation of the present invention of the independent claim 1.

Claim 2

A. Examiner's rejections

The Examiner contends that regarding claim 2, Chalmers shows in figure 1 wherein the actuating member further includes a first plate like member left side of element one of element 16 or 18 connected to an upper surface of the substantially horizontally disposed member via intervening elements and to the first planar surface of the first substantially vertically disposed plate like member adjacent a first side edge thereof

and extending substantially perpendicularly to at least the substantially horizontally disposed member for shielding at least a second portion (or bottom portion) of such air bag actuator from the detrimental extraneous foreign material and for providing added strength between the first substantially vertically disposed member and the substantially horizontally disposed member.

B. Response to Rejections

Appellant respectfully points out that element 16 of Chalmers is a C-channel as best shown in FIG. 3 and element 18 is a second beam as first disclosed in column 2 line 55 of Chalmers. Therefore, neither element anticipates a first plate like member (76) taught in claim 2 of the present invention. Furthermore, it is specifically recited in claim 2 that "first plate like member connected to an upper surface of said substantially horizontally disclosed member...". Since the Examiner admitted that element 50 anticipates substantially horizontally disclosed member (64) of the present invention and since element 50 is vertically disposed as best shown in Figure 1, such element 50 does not have an upper surface.

Therefore, Chalmers prior art reference does not anticipate each and every limitation of the present invention of the independent claim 2.

Claim 3

Claim 3 stands or falls with claim 1.

Claim 4

A. Examiner's rejections

The Examiner contends that regarding claim 4, Chalmers provides "In an alternate interpretation the first substantially vertically disposed plate like member can be element 16 which includes at least one mounting aperture shown in the area of element 22".

B. Response to Rejections

It appears that the Examiner deviated from previous understanding of Chalmers reference by asserting that it is the element 16 that now anticipates first substantially vertically disposed plate like member (66) of the present invention. In any case, Chalmers discloses in column 2 line 64 that "an orifice 22 connects the air cell 12 to the interior of the air beam 18 and provides a passage for the air to flow between these members." Accordingly, the aperture which is provided in element 16 in the area of orifice 22 is only suited to accommodate such orifice 22.

Therefore, Chalmers prior art reference does not anticipate each and every limitation of the present invention of the independent claim 4.

Claim 5

A. Examiner's rejections

The Examiner contends that regarding claim 5, Chalmers *discloses "The means connected to the opposed second surface of the first vertical plate like member includes in an alternate interpretation at least one plate member 18 and a pin member 32 disposed in the aperture".*

B. Response to Rejections

Yet again, the Examiner uses the same element 18 to anticipate the distinctly independent elements of the present invention. Furthermore, Chalmers does not disclose or suggest the element 32 is employed for securing the actuator to a control linkage of any kind.

Therefore, Chalmers prior art reference does not anticipate each and every limitation of the present invention of the independent claim 5.

Claim 6

The Examiner's contention that Claim 6 is unpatentable under 35 U.S.C. 102(b) as being anticipated by Chalmers (US Patent 2879077) is not believed to be well founded. It is the Examiner's position that Chalmers anticipates every single element of the present invention of the independent claim 6.

A. Examiner's rejections

The Examiner contends that regarding claim 6, Chalmers "shows in figure 1 an apparatus for mounting an air bag actuator to at least one brake beam, the air bag actuator having at least one inflatable air bag spring 12, the apparatus comprising: a first substantially vertically disposed plate like member 10 having a planar surface portion for engagement with a substantially planar surface portion of a second substantially vertically disposed plate like member 14 connected to such air bag actuator, the first substantially vertically disposed plate like member exposing at least a first portion of an exterior surface of such at least one inflatable air bag spring to an atmospheric operating environment characterized by a presence of detrimental extraneous foreign when such railway car mounted brake assembly is in use, a guide means 32 directly connected to and disposed closely adjacent a first outer edge of and substantially perpendicular to the planar surface portion of the first substantially vertically disposed plate like member for guiding and alignment during reciprocal motion of such air bag actuator and a securing means 52 connected to the first substantially vertically disposed plate like member for enabling attachment of the apparatus to a rigid structure".

B. Response to Rejections

Appellant already asserted above regarding claim 1 that the Examiner erred in using the beam 10 of Chalmers to anticipate a vertically disposed plate like member 66 of the present invention.

Examiner's attention is now directed to column 3, lines 3-5 wherein Chalmers discloses that rod 32 passes through an opening 34 in the air beam 18 with clearance therebetween to allow freedom for relative movement". Such "freedom of relative movement" is contradictory to the purpose of guiding and alignment.

The element 52 that the Examiner admitted is a "securing means 52 for enabling attachment of the apparatus to a rigid structure" is disclosed in column 2 lines 45-46 as a brace and is shown in Figure 1 as having a first end thereof being attached the element 10 and having a second end thereof connected to the element 50 which also has one end attached to the element 50 and the other end adapted for rotatably receiving link 54. Chalmers does not suggest or disclose that such brace 52 is used for attaching the apparatus to the rigid structure.

Therefore, Chalmers prior art reference does not anticipate each and every limitation of the present invention of the independent claim 6.

Claim 7

Claim 7 stands or falls with claim 6.

Claim 8

A. Examiner's rejections

The Examiner contends that regarding claim 8, Chalmers discloses "The means connected to the opposed second surface of the first vertical plate like member includes in an alternate interpretation at least one plate member 18 and a pin member 32 disposed in the aperture".

B. Response to Rejections

Appellant believes that Chalmers doe not disclose or suggest at least one aperture of claim 8 for attaching the planar surface of either element 10 or element 18 to the air bag actuator 12.

Therefore, Chalmers prior art reference does not anticipate each and every limitation of the present invention of the independent claim 8.

Claim 9

The Examiner's contention that Claim 9 is unpatentable under 35 U.S.C. 102(b) as being anticipated by Chalmers (US Patent 2879077) is not believed to be well founded. It is the

Examiner's position that Chalmers anticipates every single element of the present invention of the independent claim 9.

A. Examiner's rejections

The Examiner contends that regarding claim 9, Chalmers "shows in figure 1 an air spring actuator assembly, the air spring actuator assembly comprising: at least one air bag spring 12 having at least a first portion of an exterior surface exposed to an atmospheric operating environment characterized by a presence of detrimental extraneous foreign material during use of the air spring actuator assembly, a first substantially vertically disposed plate like member 10, the first substantially vertically disposed plate like member having a first substantially planar surface engageable with a first surface of a second substantially vertically disposed plate like member 14 attached to the at last one air bag spring, a substantially horizontally disposed plate like member 50 connected to the first substantially vertically disposed plate like member adjacent a bottom edge thereof and extending substantially perpendicular to the first substantially planar surface of the first substantially vertically disposed plate like member for shielding the at least said first portion of the exterior surface of the at least one air bag spring from the detrimental extraneous foreign material, a means or aperture within 10 surrounding element 32 connected to a radially opposed

second surface of the first substantially vertically disposed plate like member to a control linkage 32 of a railway vehicle brake assembly, a third substantially vertically disposed plate like member 18 having a second planar surface portion for engagement with a substantially planar surface portion of a fourth substantially vertically disposed plate like member 16 connected to the at least one air bag spring, a guide means 36 connected to and disposed closely adjacent a first outer edge of and substantially perpendicular to at least one of the first substantially planar surface and the second planar surface portion of a respective one of the first and the third substantially vertically disposed plate like member for guiding and alignment during reciprocal motion of the air bag spring and a securing means connected to the third substantially vertically disposed plate like member for enabling attachment of the air spring actuator assembly to a rigid structure."

B. Response to Rejections

The Appellant asserted above that beam 10 of Chalmers does not anticipate plate like member (66) of the present invention.

The Appellant also asserted above that vertically disposed tubular element 50 does not anticipate horizontally disposed plate like member (64) of the present invention.

The Appellant believes that the Examiner's understanding that Chalmers provides "an aperture within 10 surrounding

element 32 connected to a radially opposed second surface of the first substantially vertically disposed plate like member to a control linkage 32 of a railway vehicle brake assembly" appears to be in error. Chalmers does not disclose or suggests aperture within element 10 and further Chalmers is moot on connecting the air spring actuator assembly to a control linkage of the railway vehicle.

The Appellant demonstrated above that beam 18 of Chalmers does not anticipate plate like member (82) of the present invention.

Furthermore, the Examiner failed to show exactly how Chalmers anticipates the securing means of the present invention of independent claim 9.

Therefore, Chalmers prior art reference does not anticipate each and every limitation of the present invention of the independent claim 9.

Claim 13

Claim 13 stands or falls with claim 9.

In view of the forgoing arguments, it is requested that the final rejection of claims 1-9 and 13 under 35 U.S.C. 102(b) as being anticipated by US Patent 2879077 to Chalmers be reversed,

as this prior art patent clearly fails to disclose each and every limitation.

(7.3) Rejection under 35 U.S.C. 103(a) over US Patent 4711464 to Bilas in view of US Patent 6142480 to Streitman et al.

Claims 1, 2, 5, 6, 9, 11, 12, 13, and 18

Appellant respectfully disagrees with the Examiner's rejections for the following reasons.

A. Examiner's rejections

The Examiner contends that Bilas is silent with regards to the operating environment being characterized by a presence of detrimental extraneous foreign material.

The Examiner further contends that Streitman et al. teach in col. 1 the use of a railway vehicle brake being in the environment characterized by a presence of detrimental extraneous foreign material.

Therefore, the Examiner concluded that "It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a surrounding environment characterized by detrimental extraneous foreign material, as taught by Streitman et al., since it is old and well-known in the art that vehicles produce emissions that are byproducts of the generated power for the vehicle".

B. Response to Rejections

It has been held that to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthremore it has been held that "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). Additionally it has been held that if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Since Bilas prior art reference does not teach or suggest all the claim limitations of each independent claim 1, 6 and 9, the combination of Bilas in view of Streitman et al. fails to establish *prima facie* obviousness of claimed inventions of such independent claim 1, 6 and 9.

Accordingly, claims 2 and 5 which are depending from claim 1, claims 11-13 and claim 18 which are depending from claim 9 are also nonobvious.

Furthermore, it has been held that "in determining whether the invention as a whole would have been obvious under 35 U.S.C. 103, we must first delineate the invention as a whole. In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question...

but also to those properties of the subject matter which are inherent in the subject matter *and* are disclosed in the specification... Just as we look to a chemical and its properties when we examine the obviousness of a composition of matter claim, it is this invention *as a whole,* and not some part of it, which must be obvious under 35 U.S.C. 103." *In re Antonie*, 559 F.2d 618, 620, 195 USPQ 6,8 (CCPA 1977).

The Examiner admitted that "it is old and well-known in the art that vehicles produce emissions that are byproducts of the generated power for the vehicle".

The examiner's attention is directed to page 14, lines 14-15 wherein it is recited that "first surface portion 66 protects air spring actuator 50 from foreign objects during railway vehicle movements". Appellant asserts that it is inherent during operation of the railway vehicle for the brake assembly to be damaged by foreign objects which are disposed within the rails and therefore are present within the operating environment of the brake assembly. Since the air spring actuator which includes an inflatable elastomeric member is exposed to such environment and can be easily damaged, the present invention provides for means to shield at least a portion of the exterior surface of the inflatable elastomeric member from such foreign objects and not from "the emissions which are byproducts of the generated power for the vehicle."

Group dependent claims 2 and 5 stand or fall with claim 1.

Group dependent claims 11-13 and 18 stand or fall with claim 9.

In view of the forgoing arguments, it is requested that the final rejection of claims 1,2,5,6,9,11,12,13, and 18 under 35 U.S.C. 103(a) over US Patent 4711464 to Bilas in view of US Patent 6142480 to Streitman et al. be reversed, as the combination fails to establish *prima facie* obviousness of claimed inventions.

(7.4) Rejection under 35 U.S.C. 103(a) over US Patent 2879077 to Chalmers in view of US Patent 6142480 to Streitman et al.

Claims 1-9 and 13

Appellant respectfully disagrees with the Examiner's rejections for the following reasons.

A. Examiner's rejections

The Examiner contends that Chalmers is silent with regards to the operating environment being characterized by a presence of detrimental extraneous foreign material.

The Examiner further contends that Streitman et al. teach in col. 1 the use of a railway vehicle brake being in the environment characterized by a presence of detrimental extraneous foreign material.

Therefore, the Examiner concluded that "It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a surrounding environment characterized by detrimental extraneous foreign material, as taught by Streitman et al., since it is old and well-known in the art that vehicles produce emissions that are byproducts of the generated power for the vehicle."

B. Response to Rejections

Since Chalmers prior art reference does not teach or suggest all the claim limitations of each independent claim 1, 6 and 9, the combination of Chalmers in view of Streitman et al. does not establish *prima facie* obviousness of claimed inventions of such independent claim 1, 6 and 9.

Accordingly, claims 2-5 which are depending from claim 1, and claim 13 which is depending from claim 9 are also nonobvious.

Group dependent claims 2-5 stand or fall with claim 1.

Group dependent claim 13 stands or falls with claim 9.

In view of the forgoing arguments, it is requested that the final rejection of claims 1-9 and 13 under 35 U.S.C. 103(a) over US Patent 2879077 to Chalmers in view of US Patent 6142480 to Streitman et al. be reversed, as the combination fails to establish *prima facie* obviousness of claimed inventions.

(7.5) Rejection under 35 U.S.C. 103(a) over US Patent 4711464 to Bilas in view of US Patent 6142480 to Streitman et al. as applied to claim 9 above, and further in view of US Patent 4846785 to Cassou et al.

Claims 16-17

Appellant respectfully disagrees with the Examiner's rejections for the following reasons.

Group dependent claims 16-17 stand or fall with independent claim 9.

Therefore, it is requested that the final rejection of claims 16-17 under 35 U.S.C. 103(a) over US Patent 4711464 to Bilas in view of US Patent 6142480 to Streitman et al. as applied to claim 9 above, and further in view of US Patent 4846785 to Cassou et al. be reversed.

(7.6) Rejection under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Bilas.

Claims 19-21

Appellant respectfully disagrees with the Examiner's rejections for the following reasons.

Claim 19

A. Examiner's rejections

Examiner contends that the admitted prior art recites the railway environment, but the admitted prior art is silent as to the specific detail of the air spring actuator.

Examiner contends that the Bilas teaches in figure 1 an air spring actuator 10 comprising: a first substantially vertically disposed plate like member or right element 14 having a first substantially planar surface and a means 15 connected to the first substantially vertically disposed plate like member for securing the air spring actuator to such second control linkage, a second substantially vertically disposed plate like member or right element 27 having a second substantially planar surface and a means 23 connected to the second substantially vertically disposed plate like member for securing the air spring actuator to one of the brake beam, such second force transmitting member and a combination thereof, and at least one inflatable air bag spring 19 having a pair of substantially vertically disposed planar surfaces (left side of element 14 and left side of element 27) for engagement with and attachment to the first substantially planar surface of the first substantially vertically disposed plate like member and the second substantially planar surface of the second substantially vertically disposed plate like member whereby selective inflation and deflation of the at least one inflatable air bag

spring in a longitudinal direction enables a reciprocal motion thereof to move such control linkages and such force transmitting members for actuating and deactuating such brake beams wherein an exterior surface of the at least one inflatable air bag spring is at least partially exposed within such brake assembly to an atmosphere when such brake assembly is in use by virtue of the apertures 17 and 18.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the air spring actuator of the admitted prior art to have included an air spring actuator, as taught by Bilas, in order to provide a means of relieving excessive pressure conditions by continuously exposing the area of the actuator above element 13 to the environment. With regards to claims 20 and 21, see element 13' as the means for shielding and guiding and aligning".

B. Response to Rejections

It has been shown that element 14 of Bilas being an annular flange does not anticipate the first plate like member (66) of the present invention of claim 19.

Equally as well, element 27 which is another annular flange does not anticipate second plate like member (82) of the present invention of claim 19.

Accordingly, the combination of admitted prior art and Bilas fails to teach all claims limitations and fails to establish *prima facie* obviousness of claimed invention.

Furthermore, it has been held that "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention". *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)

Accordingly, Bilas, when considered in its entirety, provides for air spring actuator which is disposed and operates within the cylindrical housing 10 closed by a pair of end plates 12 and 25. Therefore, the combination of admitted prior art and Bilas would have suggested to one of ordinary skill in the art to fully enclose the air spring actuator of the present invention into the cylindrical housing closed by the pair of end plates.

However, the present invention provides an air spring actuator including an inflatable air spring which has exterior surface exposed within the railway mounted brake assembly.

Additionally, it is believed that the Examiner's understanding that the present invention "provides a means of relieving excessive pressure conditions..." is in error since the present invention is moot on the need to relieve excessive pressure.

Claims 20

Group dependent claim 20 stands or falls with independent claim 19.

Claim 21

A. Examiner's rejections

Examiner contends that element 13 provides the means for shielding and guiding and aligning.

B. Response to Rejections

Bilas discloses in column 1 lines 66-68 annular guide lip 14 which extends from the perimeter of the partition 13 which is movable positioned within the housing 13. Since, Bilas was compelled to provide specific guide lip 14, the Examiner's position that element 13 is suitable for use as a guide means is in error.

Therefore, it is requested that the final rejection of claims 19-21 under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Bilas be reversed.

(7.7) Rejection under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Bilas and further in view of US Patent 6142480 to Streitman et al.

Claims 19-21

Since the Appellant soundly demonstrated that combination of admitted prior art in claim 19 in view of Bilas fails to anticipate each and every limitation of the claimed invention and therefore fails to establish *prima facie* obviousness of claimed invention, it is requested that the final rejection of claims 19-21 under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Bilas and further in view of US Patent 6142480 to Streitman et al. be reversed.

Group dependent claims 20-21 stand or fall with independent claim 19.

(7.8) Rejection under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Chalmers.

Claims 19-21

Appellant respectfully disagrees with the Examiner's rejections for the following reasons.

Claim 19

A. Examiner's rejections

Examiner contends that "the admitted prior art recites the railway environment, but the admitted prior art is silent as to the specific detail of the air spring actuator".

The Examiner further contends that Chalmers, "teaches in figure 1 an air spring actuator comprising: a first substantially vertically disposed plate like member or right element 10 having a first substantially planar surface and a means 52 connected to the first substantially vertically disposed plate like member for securing the air spring actuator to such second control linkage, a second substantially vertically disposed plate like member or right element 14 having a second substantially planar surface and a means 50 connected to the second substantially vertically disposed plate like member for securing the air spring actuator to one of the brake beam, such second force transmitting member and a combination thereof, and at least one inflatable air bag spring 12 having a pair of substantially vertically disposed planar surfaces 16 and 18 for engagement with and attachment to the first substantially planar surface of the first substantially vertically disposed plate like member and the second. substantially planar surface of the second substantially vertically disposed plate like member whereby selective inflation and deflation of the at least

one inflatable air bag spring in a longitudinal direction enables a reciprocal motion thereof to move such control linkages and such force transmitting.. members for actuating and deactuating such brake beams wherein an exterior surface of the at least one inflatable air bag spring is at least partially exposed within such brake assembly to an atmosphere when such brake assembly is in use as shown."

Therefore, the Examiner concludes that "It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the air spring actuator of the admitted prior art to have included an air spring actuator, as taught by Chalmers, in order to provide a means of exposing the actuator to reduce assembly weight."

B. Response to Rejections

It has been shown that element 10 of Chalmers being a beam does not anticipate the first plate like member (66) of the present invention of claim 19.

Equally as well, it has been shown that Chalmers does not teach or suggest that element 52 which is a tubular brace be employed as means for connecting to control linkage.

Furthermore, it has been shown that that Chalmers does not teach or suggest that tubular member 50 is capable of securing the air spring actuator to one of the brake beam.

Accordingly, the combination of admitted prior art and Chalmers fails to teach all claims limitations and fails to establish *prima facie* obviousness of claimed invention.

Additionally, the Examiner's understanding that Chalmers prior art reference is capable of reducing weight of the air spring actuator of the admitted prior art is believed to be in error. Chalmers, taken in its entirety, teaches complex beam elements 10 and 18 which include a plurality of reinforcing members that would increase weight of the air spring actuator.

Claim 20

A. Examiner's rejections

Examiner contends that element 32 provides means for shielding and guiding and aligning.

B. Response to Rejections

Chalmers fails to disclose or suggest that rod 32 is capable of shielding at least a portion of the exterior surface of the air spring 12. Therefore, the Examiner's contention that element 32 provides means for shielding is appears to be in error.

Claim 21

Group dependent claim 21 stands or falls with independent claim 19.

Therefore, it is requested that the final rejection of claims 19-21 under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Chalmers be reversed.

(7.8) Rejection under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Chalmers and further in view of US Patent 6142480 to Streitman et al.

Claims 19-21

Since the Appellant soundly demonstrated that combination of admitted prior art in claim 19 in view of Chalmers fails to anticipate each and every limitation of the claimed invention and therefore fails to establish *prima facie* obviousness of claimed invention, it is requested that the final rejection of claims 19-21 under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Chalmers and further in view of US Patent 6142480 to Streitman et al. be reversed.

Group dependent claims 20-21 stand or fall with independent claim 19.

(7.9) Conclusion

In view of the above considerations, and regarding the rejections of claims, it is respectfully submitted that the Examiner erred in finally rejecting:

1. Claims 1,2,5,6,9,11,12,13, and 18 under 35 U.S.C. 102(b) as being anticipated by US Patent 4711464 to Bilas;

2. Claims 1-9 and 13 under 35 U.S.C. 102(b) as being anticipated by US Patent 2879077 to Chalmers;

3. Claims 1,2,5,6,9,11, 12, 13, and 18 under 35 U.S.C. 103(a) over US Patent 4711464 to Bilas in view of US Patent 6142480 to Streitman et al.;

4. Claims 1-9 and 13 under 35 U.S.C. 103(a) over US Patent 2879077 to Chalmers in view of US Patent 6142480 to Streitman et al.;

5. Claims 16 and 17 under 35 U.S.C. 103(a) over Bilas in view of Streitman et al. as applied to claim 9 above, and further in view of US Patent 4846785 to Cassou et al.;

6. Claims 19, 20, and 21 under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Bilas.;

7. Claims 19-21 under 35 U.S.C. 103(a) over Admitted prior art in view of US Patent 4711464 to Bilas and further in view of US Patent 6142480 to Streitman et al.;

8. Claims 19, 20, and 21 under 35 U.S.C. 103(a) over Admitted prior art recited above the "improvement" phrase in claim 19 in view of Chalmers.; and

9. Claims 19-21 under 35 U.S.C. 103(a) over Admitted prior art in view of Chalmers and further in view of US Patent 6142480 to Streitman et al.

For the reasons set forth above, it is respectfully requested that the final rejection of the claims be reversed.

Respectfully submitted,

by James O. Ray

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(8) Claims Appendix

1. An actuating member for a railway vehicle brake assembly, such railway vehicle brake assembly having an air bag actuator incorporated therein, said air bag actuator having at least one inflatable air bag spring, said actuating member comprising:

(a) a first substantially vertically disposed plate like member, said first substantially vertically disposed plate like member having a first substantially planar surface engageable with a first surface of a second substantially vertically disposed plate like member attached to such air bag actuator, said first substantially vertically disposed plate like member exposing at least a first portion of an exterior surface of such at least one inflatable air bag spring to an atmospheric operating environment characterized by a presence of detrimental extraneous foreign material when such railway car mounted brake assembly is in use;

(b) a substantially horizontally disposed plate like member connected to said first substantially vertically disposed plate like member adjacent a bottom edge thereof and extending substantially perpendicular to said first substantially planar surface of said first substantially vertically disposed plate like member for shielding at least said first portion of said

exterior surface of such air bag actuator from said detrimental extraneous foreign material; and

(c) a means connected to a radially opposed second surface of said first substantially vertically disposed plate like member for securing said actuating member to a control linkage of such railway vehicle brake assembly.

2. An actuating member, according to claim 1, wherein said actuating member further includes a first plate like member connected to an upper surface of said substantially horizontally disposed member and to said first planar surface of said first substantially vertically disposed plate like member adjacent a first side edge thereof and extending substantially perpendicular to at least said substantially horizontally disposed member for shielding at least a second portion of such air bag actuator from said detrimental extraneous foreign material and for providing added strength between said first substantially vertically disposed member and said substantially horizontally disposed member.

3. (An actuating member, according to claim 2, wherein said actuating member further includes a second plate like member connected to said upper surface of said substantially horizontally disposed member and to said first planar surface of

said first substantially vertically disposed plate like member adjacent a second side edge thereof and extending substantially perpendicular to at least said substantially horizontally disposed member for shielding at least a third portion of such air bag actuator from said detrimental extraneous foreign material and for providing added strength between said first substantially vertically disposed member and said substantially horizontally disposed member.

4. An actuating member, according to claim 1, wherein said first substantially vertically disposed plate like member includes at least one mounting aperture formed therethrough for enabling securing of such air bag actuator to said first substantially vertically disposed plate like member.

5. An actuating member, according to claim 1, wherein said means connected to said radially opposed second surface of said substantially first vertically disposed plate like member for securing said actuating member to such control linkage of such railway vehicle brake assembly includes at least one plate member having an aperture formed therethrough and a pin member disposed in said aperture for securing said at least one plate member to such control linkage.

6. An apparatus for mounting an air bag actuator to at least one brake beam, said air bag actuator having at least one inflatable air bag spring, said apparatus comprising:

(a) a first substantially vertically disposed plate like member having a planar surface portion for engagement with a substantially planar surface portion of a second substantially vertically disposed plate like member connected to such air bag actuator, said first substantially vertically disposed plate like member exposing at least a first portion of an exterior surface of such at least one inflatable air bag spring to an atmospheric operating environment characterized by a presence of detrimental extraneous foreign when such railway car mounted brake assembly is in use;

(b) a guide means directly connected to and disposed closely adjacent a first outer edge of and substantially perpendicular to said planar surface portion of said first substantially vertically disposed plate like member for guiding and alignment during reciprocal motion of such air bag actuator; and

(c) a securing means connected to said first substantially vertically disposed plate like member for enabling attachment of said apparatus to a rigid structure.

7. An apparatus, according to claim 6, wherein said apparatus includes a second guide means, said second guide means directly connected to and disposed closely adjacent a second outer edge of and substantially perpendicular to said planar surface portion of said first substantially vertically disposed plate like member for guiding and alignment during reciprocal motion of such air bag actuator.

8. An apparatus, according to claim 6, wherein said planar surface portion of said first substantially vertically disposed plate like member includes at least one aperture formed therethrough for enabling attachment to such air bag actuator.

9. An air spring actuator assembly, said air spring actuator assembly comprising:

(a) at least one air bag spring having at least a first portion of an exterior surface exposed to an atmospheric operating environment characterized by a presence of detrimental extraneous foreign material during use of said air spring actuator assembly;

(b) a first substantially vertically disposed plate like member, said first substantially vertically disposed plate like member having a first substantially planar surface engageable with a first surface of a second substantially vertically

disposed plate like member attached to said at least one air bag spring;

(c) a substantially horizontally disposed plate like member connected to said first substantially vertically disposed plate like member adjacent a bottom edge thereof and extending substantially perpendicular to said first substantially planar surface of said first substantially vertically disposed plate like member for shielding said at least said first portion of said exterior surface of said at least one air bag spring from said detrimental extraneous foreign material;

(d) a means connected to a radially opposed second surface of said first substantially vertically disposed plate like member for securing said first substantially vertically disposed plate like member to a control linkage of a railway vehicle brake assembly;

(e) a third substantially vertically disposed plate like member having a second planar surface portion for engagement with a substantially planar surface portion of a forth substantially vertically disposed plate like member connected to said at least one air bag spring;

(f) a guide means connected to and disposed closely adjacent a first outer edge of and substantially perpendicular to at least one of said first substantially planar surface and said second planar surface portion of a respective one of said

first and said third substantially vertically disposed plate like member for guiding and alignment during reciprocal motion of such air bag spring; and

(g) a securing means connected to said third substantially vertically disposed plate like member for enabling attachment of said air spring actuator assembly to a rigid structure.

10. An air spring actuator assembly, according to claim 9, wherein said means connected to a radially opposed second surface of said first substantially vertically disposed plate like member for securing said first substantially vertically disposed plate like member to a control linkage of a railway vehicle brake assembly includes a push rod and a shield member for substantially protecting said at least one air bag spring from foreign matter damage.

11. An air spring actuator assembly, according to claim 9, wherein said air spring actuator assembly further includes means disposed therein for limiting reciprocal motion of said air spring actuator during evacuation of air pressure from said at least one air bag spring.

12. An air spring actuator assembly, according to claim 11, wherein said means for limiting reciprocal motion of said brake

actuator is a rigid member disposed internally within said air spring actuator.

13. An air spring actuator assembly, according to claim 9, wherein said air spring actuator further includes an air inlet in communication with said at least one air bag spring.

14.-15. (Canceled)

16. An air spring actuator assembly, according to claim 9, wherein said air spring actuator further includes a means for visual determination of a travel length of said air spring actuator.

17. An air spring actuator assembly, according to claim 16, wherein said visual travel determination means is a linear measuring device.

18. (An air spring actuator assembly, according to claim 9, wherein said air spring actuator assembly further includes means disposed therein for controlling volume of air in said at least one air bag spring.

19. In a railway car mounted brake assembly including a pair of brake beams mounted at each end of such car mounted brake assembly, each of such brake beams having a brake head attachable to each end thereof, each of such brake heads carrying a brake shoe thereon, each of such brake heads being positioned for engagement of a respective one of such brake shoes with a respective railway vehicle wheel during a brake application, each of such brake beams having a control linkage pivotally attached thereto, a first force transmitting member attached to opposed first ends of each of such control linkages and a second force transmitting member attached to a second end of one of such control linkage and longitudinally extending toward a respectively opposed second end of such control linkage: the improvement comprising an air spring actuator connectable to and disposed intermediate such second force transmitting member and such second control linkage for applying and releasing such brake beams, said air spring actuator comprising:

(a) a first substantially vertically disposed plate like member having a first substantially planar surface and a means connected to said first substantially vertically disposed plate like member for securing said air spring actuator to such second control linkage;

(b) a second substantially vertically disposed plate like member having a second substantially planar surface and a means connected to said second substantially vertically disposed plate like member for securing said air spring actuator to one of such brake beam, such second force transmitting member and a combination thereof; and

(c) at least one inflatable air bag spring having a pair of substantially vertically disposed planar surfaces for engagement with and attachment to said first substantially planar surface of said first substantially vertically disposed plate like member and said second substantially planar surface of said second substantially vertically disposed plate like member, whereby selective inflation and deflation of said at least one inflatable air bag spring in a longitudinal direction enables a reciprocal motion thereof to move such control linkages and such force transmitting members for actuating and deactuating such brake beams, wherein an exterior surface of said at least one inflatable air bag spring is at least partially exposed within such railway car mounted brake assembly to an atmosphere when such railway car mounted brake assembly is in use.

20. The improvement according to claim 19, wherein said air spring actuator includes means attached to said first substantially vertically disposed plate like member for

shielding at least a portion of said at least one inflatable air bag spring from detrimental extraneous foreign material.

21. The improvement according to claim 19, wherein said air spring actuator includes means disposed with said first substantially vertically disposed plate like member and said second substantially vertically disposed plate like member for guiding and alignment thereof during said reciprocal motion of said at least one inflatable air bag spring.

(9) Evidence Appendix page(s)

1. US Patent 4,711,464 to entered by the Examiner in the Office Action mailed October 30, 2006;
2. US Patent 2,879,077 to Chalmers entered by the Examiner in the Office Action mailed October 30, 2006;
3. US Patent 6,142,480 to Streitman et al. first entered by the Examiner in the Office Action mailed February 1, 2006;
4. US Patent 4,846,785 to Cassou et al. first entered by the Examiner in the Office Action mailed November 17, 2004;
5. US Patent 6,116,385 to Ring incorporated-by-reference in the Applicant's disclosure of the present invention.

10) Related Proceedings Appendix page(s)

6. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974);
7. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970);
8. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988);
9. *In re Antonie*, 559 F.2d 618, 620, 195 USPQ 6,8 (CCPA 1977);
10. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

57 C.C.P.A. 1029, 424 F.2d 1382, 165 U.S.P.Q. 494
(Cite as: 57 C.C.P.A. 1029, 424 F.2d 1382)

C
Application of Wilson,
Cust. & Pat.App.,1970.

United States Court of Customs and Patent Appeals.
Application of David W. WILSON.
Patent Appeal No. 8271.

May 7, 1970.

Proceeding on patent application serial No. 332,321. The Patent Office Board of Appeals affirmed rejection of claims 1-4, 8-10, and 15-21, and applicant appealed. The Court of Customs and Patent Appeals, Lane, J., held that Patent Office Board of Appeals' disregard of term 'incompatible' as used in claims relating to treatment of power driven rotary brushes with 'incompatible' resins rendered its conclusion of obviousness unsupported.

Reversed.
West Headnotes
[1] **Patents 291 ⇐101(5)**

291 Patents
291IV Applications and Proceedings Thereon
291k101 Claims
291k101(5) k. Requisites and Sufficiency. Most Cited Cases
Specification with respect to composition for treatment of power driven rotary brushes was sufficient to support claims in issue. 35 U.S.C.A. § 112.

[2] **Patents 291 ⇐51(1)**

291 Patents
291II Patentability
291II(D) Anticipation
291k50 Prior Knowledge or Use
291k51 Nature and Extent in General
291k51(1) k. In General. Most Cited Cases
All words in claim must be considered in judging patentability of claim against prior art. 35 U.S.C.A. § 103.

[3] **Patents 291 ⇐16(1)**

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k16 Invention and Obviousness in General
291k16(1) k. In General. Most Cited Cases
(Formerly 291k18)

Patents 291 ⇐101(6)

291 Patents
291IV Applications and Proceedings Thereon
291k101 Claims
291k101(6) k. Ambiguity, Uncertainty or Indefiniteness. Most Cited Cases
If no reasonably definite meaning can be ascribed to certain terms in claim, subject matter does not become obvious, but claim becomes indefinite. 35 U.S.C.A. § 503.

[4] **Patents 291 ⇐113(6)**

291 Patents
291IV Applications and Proceedings Thereon
291k113 Appeals from Decisions of Commissioner of Patents
291k113(6) k. Review on Appeal in General. Most Cited Cases
Patent Office Board of Appeals' disregard of term " incompatible" as used in claims relating to treatment of power driven rotary brushes with " incompatible" resins rendered its conclusion of obviousness unsupported. 35 U.S.C.A. § 103.

Patents 291 ⇐328(2)

291 Patents
291XIII Decisions on the Validity, Construction,

and Infringement of Particular Patents
291k328 Patents Enumerated
291k328(2) k. Original. Most Cited Cases
2,933,469, 2,890,136, 3,051,670, 3,015,638. Cited.

**1382 *1029 Oberlin, Maky, Donnelly & Renner, William E. Thomson, Jr., John C. Oberlin, Cleveland, Ohio, attorneys of record, for appellant. Joseph Schimmel, Washington, D.C., for the Commissioner of Patents. Raymond E. Martin, Washington, D.C., of counsel.

Before RICH, Acting Chief Judge, ALMOND, BALDWIN and LANE, Judges, and FORD, Judge, United States Customs Court, sitting by designation.

LANE, Judge.

This appeal is from the decision of the Patent Office Board of Appeals, which affirmed the rejection of claims 1-4, 8-10, and 15-21 in appellant's application serial No. 332,321, filed November 5, 1963, for 'Treated Brush and Brush Treating Composition.' Four other claims have been allowed. We conclude that the board's decision must be reversed.

THE DISCLOSURE

Appellant's disclosure discusses certain problems in the treatment of power-driven rotary brushes. According to the disclosure, it was desirable to produce**1383 a composition for treating the brush bristles, whereby the ability of the bristles to hold abrasive particles would be enhanced. It discloses that the treatment composition should have a strength of adhesion to the brush bristles sufficiently great to prevent such composition from transferring excessively to the object being brushed; that the treatment material should wear at substantially the same rate as the brush bristles; that the material should have a high temperature softening point; and that the strength of adhesion between the treating composition and the abrasive particles must be sufficient to withstand the centrifugal force which normally would tend to throw the abrasive outwardly from the brush. The disclosure *1030 states that previously known brush-treating compositions did not accomplish all these objectives and had a tendency to dry and lose their tackiness over a period of time, thus becoming useless for holding abrasive particles on the bristles.

The disclosure states that appellant discovered that a composition having a high temperature softening point and a high degree of tackiness could be produced if a film-forming resin were blended with a tackifier resin which was incompatible with (insoluble in) the film-forming resin. The resulting composition would have two distinct phases: a continuous phase comprised of film-forming resin, either alone or saturated with a small quantity of tackifier resin, and a dispersed phase comprised of small particles of tackifier resin. The two resins may be either completely or partially incompatible, and the disclosure states that the more insoluble the resins, the greater the tack which the composition possesses. Appellant also disclosed that certain plasticizers could be added to render the resins more incompatible, thus further increasing the tack of the composition. Finally, appellant stated that the entire composition could be dissolved in a volatile solvent to allow easy application to the brush, the solvent being one which quickly evaporates upon such application.

The specification contains a list of suitable film-forming resins, including ethyl cellulose, nitro cellulose, cellulose acetate, polyvinyl acetate and cis-polyisoprene, among other materials. A list of tackifiers is given, including certain esters of abietic acid, polyvinyl ethyl ether, coumarone indene resin and terpene resins. A list of plasticizers is also given. The specification then gives four examples showing how to combine various film-formers, tackifiers, plasticizers and solvents to obtain brush-treating compositions of the desired characteristics, and explains how to apply them to brushes.

THE CLAIMS

In view of the result we reach, we find that claims 1 and 8 are representative:

1. A two-phase brush treating composition having a high softening point and sufficient tack to retain abrasive material firmly adhered to brush fill material comprising a film-forming resin and a

tackifier resin which is incompatible with said film-forming resin, said two phases comprising a continuous phase formed of said film-forming resin and a dispersed phase formed of small particles of tackifier resin.

8. In combination, a rotary brush having brush fill material and a two-phase pressure sensitive adhesive brush treating composition adhered thereto having a high softening point and sufficient tack to retain abrasive material firmly adhered to such brush fill material comprising a film-forming resin and a tackifier resin which is incompatible with said film-forming resin, said two phases *1031 comprising a continuous phase formed of said film-forming resin and a dispersed phase formed of small particles of tackifier resin.

**1384 The remaining claims on appeal are narrower, containing recitations of specific resins, plasticizers, etc.

THE PRIOR ART

Grantham[FN1] relates to coatings for film material and discloses a coating composition comprising a cellulose derivative film-former, a blending resin, a plasticizer, and an organic solvent. Grantham teaches that the blending agent and the film-former should be compatible.

FN1. U.S.Pat. 3,051,670, issued August 28, 1962.

Depew[FN2] teaches the preparation of emulsions consisting of a continuous phase of water and a discontinuous phase of elastomer particles and particles of a volatile hydrocarbon, with vulcanizing ingredients and other additives dispersed in the hydrocarbon particles. Depew then stated that where a dispersion with additional adhesive properties is desired, an adhesive, such as certain of the tackifier resins disclosed by appellants, can be added to the emulsion, and that

FN2. U.S.Pat. 2,933,469, issued April 19, 1960.

this adhesive can be water soluble or dispersed as particles. * * * The chemistry of the adhesive component is not critical to this invention. The important thing is that the deposited film shall be tacky and adhesive.

Sergi[FN3] relates to adhesives suitable for installation of floor-covering products such as linoleum. Sergi's composition consists of a tackifier resin dispersed in a latex binder; the tackifier and latex must be compatible with one another, according to the Sergi disclosure.

FN3. U.S.Pat. 3,015,638, issued January 2, 1962.

Vaughan[FN4] teaches impregnating a fibrous buffing wheel with an aqueous emulsion consisting of a tacky resin and an emulsifier or stabilizer such as glue or gum.

FN4. U.S.Pat. 2,890,136, issued June 9, 1959.

THE BOARD

The board found the composition claims to be unpatentable over Depew, Sergi or Grantham under 35 U.S.C. § 103, The board reached this conclusion after noting that each of the three references shows some of the film-formers, tackifiers, plasticizers and solvents appearing in appellant's lists. The board found that the recited limitation of incompatibility was too relative a term to distinguish over the compositions of the references.

The board found that the claims to the treated brush were unpatentable, under 35 U.S.C. § 103, over Vaughan in view of Sergi or Depew. Since Vaughan shows treating brushes, the board apparently considered*1032 it obvious to treat brushes with compositions which it thought were made obvious by Sergi or Depew.

The board also affirmed the rejection of certain claims for being 'broader than the disclosure' under 35 U.S.C. § 112. The board's basis for this

rejection was that the specification did not provide adequate guidelines for making a selection among the various disclosed ingredients, nor among other materials which are not disclosed but would be included by the claims.

OPINION

[1] We first treat the rejection under section 112. This rejection is in effect an attack on the specification as being insufficient to teach how to practice the broad invention claimed. The rejection is therefore under the first paragraph of section 112. The board's position, as mentioned above, was that the specification did not teach how to select ingredients so that the desired incompatibility would result. We disagree with the board's position on this point. First of all, appellant provided four examples, each specifying the nature and amounts of materials to be used. Secondly, the record indicates that it involves only routine experimentation to find out which resins are incompatible. The examiner admitted as much when, **1385 with regard to obviousness, he said ' selecting the proper tackifier and film-forming resin from those listed in the references to form an emulsion or two-phase composition would be within the expected skill of the art and would merely involve routine experimentation.'We conclude that appellant has provided a sufficient specification to support the claims here in issue.

[2][3][4] Turning to the rejection of the claims for obviousness, we again disagree with the board's position. The board has disregarded the term ' incompatible,' as used in the claims, because it is ' too relative' to distinguish over the compositions of the references. Appellant contends this limitation is essential in defining his invention. There has been no rejection here for indefiniteness, under the second paragraph of section 112. Rather than reject the claims as indefinite, the board chose to ignore the language it considered indefinite, and proceeded as though that language were not in the claims. The board said, in effect, that since we do not know what 'incompatible' means, and the rest of the claim defines obvious subject matter, there is no basis for concluding unobviousness. This reasoning is incorrect. All words in a claim must be considered in judging the patentability of that claim against the prior art. If no reasonably definite meaning can be ascribed to certain terms in the claim, the subject matter does not become obvious-the claim becomes indefinite. In the present case, we think the *1033 term 'incompatible' is defined with reasonable definiteness in the specification. While it is true that the word is not perfectly precise, under the circumstances of the present case there appears to be no other way for appellant to describe his discovery. In any event, the ignoring of this term by the board renders its conclusion of obviousness unsupported. None of the references discloses a two-phase composition of incompatible resins or suggests that such a composition would have the properties disclosed by appellant. Grantham and Sergi both expressly teach that the components of their compositions should be compatible. Neither Vaughan nor Depew uses a resin as the continuous phase. While Depew states, as quoted above, that the adhesive material may be dispersed as particles in the continuous phase, and hence be incompatible with the continuous phase material, it cannot be ignored that Depew's continuous phase is of water, not a film-forming resin as recited in appellant's claims. Furthermore, there is no suggestion in Depew or Vaughan that there are advantages in using an adhesive which is insoluble in the aqueous phase. There is nothing of record, therefore, from which we can properly conclude that the subject matter of appellant's claims would have been obvious at the time of his invention. The decision of the board must accordingly be reversed.

Reversed.

Cust. & Pat.App.,1970.
Application of Wilson
57 C.C.P.A. 1029, 424 F.2d 1382, 165 U.S.P.Q. 494

END OF DOCUMENT

Westlaw.

837 F.2d 1071, 5 U.S.P.Q.2d 1596
(Cite as: 837 F.2d 1071)

C

In re Fine
C.A.Fed.,1988.

United States Court of Appeals,Federal Circuit.
In re David H. FINE
No. 87-1319.

Jan. 26, 1988.

The Board of Patent Appeals and Interferences of the United States Patent and Trademark Office affirmed rejection of claims of application for patent for system for detecting and measuring minute quantities of nitrogen compounds, and applicant appealed. The Court of Appeals, Mayer, Circuit Judge, held that: (1) it would not have been obvious to substitute nitric oxide detector for sulfur dioxide detector in prior system, and (2) sulfur detection system did not teach use of claimed temperature range.

Reversed.

Edward S. Smith, Circuit Judge, dissented and filed opinion.

West Headnotes

[1] Patents 291 ⇐16.33

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k16.33 k. Measuring, Testing and Indicating Devices. Most Cited Cases
System for detecting and measuring minute quantities of nitrogen compounds was not obvious in light of prior art for separating, identifying, and monitoring sulfur compounds or method for measuring chemiluminescence of reaction between nitric oxide and ozone which required continuous flowing of gaseous mixture into reaction chamber; method for measuring sulfur deliberately sought to avoid nitrogen compounds, and claimed invention retained each nitrogen compound constituent of gaseous sample in chromatograph for individual time period. 35 U.S.C.A. § 103.

[2] Patents 291 ⇐114.19

291 Patents
291IV Applications and Proceedings Thereon
291k114.15 Hearing and Scope of Inquiry
291k114.19 k. Presumptions and Burden of Proof. Most Cited Cases

Patents 291 ⇐114.21

291 Patents
291IV Applications and Proceedings Thereon
291k114.15 Hearing and Scope of Inquiry
291k114.21 k. Weight and Sufficiency of Evidence. Most Cited Cases
Patent and Trademark Office has burden to establish prima facie case of obviousness, which it may satisfy only by showing some objective teaching in prior art, or that knowledge generally available to one of ordinary skill and art would lead that individual to combined relevant teachings of references. 35 U.S.C.A. § 103.

[3] Patents 291 ⇐26(1)

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k26 Combination
291k26(1) k. In General. Most Cited Cases
Whether particular combination might be "obvious to try" is not legitimate test of patentability. 35 U.S.C.A. § 103.

[4] Patents 291 ⇐16.5(1)

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k16.5 State of Prior Art and

Advancement Therein
291k16.5(1) k. In General. Most Cited Cases
(Formerly 291k16.5)
Patent which described preferred temperature range for separating, identifying and quantitatively monitoring sulfur compounds could be distinguished from claimed method for detecting and measuring minute quantities of nitrogen compounds which limited temperature to prevent nitrogen from other sources, where purpose of temperature limitation in prior art was to avoid formation of unwanted sulfides.

Patents 291 ⇐328(2)

291 Patents
291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents
291k328 Patents Enumerated
291k328(2) k. Original Utility. Most Cited Cases
3,207,585, 3,650,696, 3,746,513. Cited as prior art.

*1072 Morris Relson, Darby & Darby, P.C., New York City, for appellant. With him on the brief was Beverly B. Goodwin.
Lee E. Barrett, Associate Sol., Office of the Solicitor, Arlington, Va., for appellee. With him on the brief were Joseph F. Nakamura, Sol. and Fred E. McKelvey, Deputy Sol.

Before FRIEDMAN, SMITH and MAYER, Circuit Judges.

OPINION

MAYER, Circuit Judge.
David H. Fine appeals from a decision of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board) affirming the rejection of certain claims of his application, Serial No. 512,374, and concluding that his invention would have been obvious to one of ordinary skill in the art and was therefore unpatentable under 35 U.S.C. § 103. We reverse.

BACKGROUND

A. The Invention.

The invention claimed is a system for detecting and measuring minute quantities of nitrogen compounds. According to Fine, the system has the ability to detect the presence of nitrogen compounds in quantities as minute as one part in one billion, and is an effective means to detect drugs and explosives, which emanate nitrogen compound vapors even when they are concealed in luggage and closed containers.

The claimed invention has three major components: (1) a gas chromatograph which separates a gaseous sample into its constituent parts; (2) a converter which converts the nitrogen compound effluent output of the chromatograph into nitric oxide in a hot, oxygen-rich environment; and (3) a detector for measuring the level of nitric oxide. The claimed invention's sensitivity is achieved by combining nitric oxide with ozone to produce nitrogen dioxide which concurrently causes a detectable luminescence. The luminescence, which is measured by a visual detector, shows the level of nitric oxide which in turn is a measure of nitrogen compounds found in the sample.

The appealed claims were rejected by the Patent and Trademark Office (PTO) under 35 U.S.C. § 103 . Claims 60, 63, 77 and 80 were rejected as unpatentable over Eads, Patent No. 3,650,696 (Eads) in view of Warnick, et al., Patent No. 3,746,513 (Warnick). Claims 62, 68, 69, 79, 85 and 86 were rejected as unpatentable over Eads and Warnick in view of Glass, et al., Patent No. 3,207,585 (Glass).

B. The Prior Art.

1. *Eads Patent.*

Eads discloses a method for separating, identifying and quantitatively monitoring *1073 sulfur compounds. The Eads system is used primarily in " air pollution control work in the scientific characterization of odors from sulfur compounds."

The problem addressed by Eads is the tendency of sulfur compounds "to adhere to or react with the surface materials of the sampling and analytical equipment, and/or react with the liquid or gaseous materials in the equipment." Because of this, the accuracy of measurement is impaired. To solve the problem, the Eads system collects an air sample containing sulfur compounds in a sulfur-free methanol solution. The liquid is inserted into a gas chromatograph which separates the various sulfur compounds. The compounds are next sent through a pyrolysis furnace where they are oxidized to form sulfur dioxide. Finally, the sulfur dioxide passes through a measuring device called a microcoulometer which uses titration cells to calculate the concentration of sulfur compounds in the sample.

2. *Warnick Patent.*

Warnick is directed to a means for detecting the quantity of pollutants in the atmosphere. By measuring the chemiluminescence of the reaction between nitric oxide and ozone, the Warnick device can detect the concentration of nitric oxide in a sample gaseous mixture.

Warnick calls for "continuously flowing" a sample gaseous mixture and a reactant containing ozone into a reaction chamber. The chemiluminescence from the resulting reaction is transmitted through a light-transmitting element to produce continuous readouts of the total amount of nitric oxide present in the sample.

3. *Glass Patent.*

The invention disclosed in Glass is a device for " completely burning a measured amount of a substance and analyzing the combustion products." A fixed amount of a liquid petroleum sample and oxygen are supplied to a flame. The flame is then spark-ignited, causing the sample to burn. The resulting combustion products are then collected and measured, and from this measurement the hydrogen concentration in the sample is computed.

C. The Rejection.

The Examiner rejected claims 60, 63, 77 and 80 because "substitution of the [nitric oxide] detector of Warnick for the sulfur detector of Eads would be an obvious consideration if interested in nitrogen compounds, and would yield the claimed invention." He further asserted that "Eads teaches the [claimed] combination of chromatograph, combustion, and detection, in that order.... Substitution of detectors to measure any component of interest is well within the skill of the art." In rejecting claims 62, 68, 69, 79, 85 and 86, the Examiner said, "Glass et al. teach a flame conversion means followed by a detector, and substitution of the flame conversion means of Glass et al. for the furnace of Eads would be an obvious equivalent and would yield the claimed invention." The Board affirmed the Examiner's rejection.

DISCUSSION

A. Standard of Review.

Obviousness under 35 U.S.C. § 103 is " 'a legal conclusion based on factual evidence.' " *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed.Cir.1983) (quoting *Stevenson v. Int'l Trade Comm'n*, 612 F.2d 546, 549, 204 USPQ 276, 279 (CCPA 1979)). Therefore, an obviousness determination is not reviewed under the clearly erroneous standard applicable to fact findings, *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 956, 220 USPQ 592, 596 (Fed.Cir.1983); it is "reviewed for correctness or error as a matter of law. " *In re De Blauwe*, 736 F.2d 699, 703, 222 USPQ 191, 195 (Fed.Cir.1984).
To reach a proper conclusion under § 103, the decisionmaker must step backward in time and into the shoes worn by [a person having ordinary skill in the art] when the invention was unknown and just before it was made. In light of *all* the evidence, the decisionmaker must then determine whether ... the claimed invention as a whole would have been *1074 obvious at *that* time to *that* person. 35 U.S.C. § 103. The answer to that question partakes more of the nature of law than of fact, for it is an

ultimate conclusion based on a foundation formed of all the probative facts.

Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1566, 1 USPQ2d 1593, 1595-96 (Fed.Cir.1987).

B. Prima Facie Obviousness.

Fine says the PTO has not established a *prima facie* case of obviousness. He contends the references applied by the Board and Examiner were improperly combined, using hindsight reconstruction, without evidence to support the combination and in the face of contrary teachings in the prior art. He argues that the appealed claims were rejected because the PTO thought it would have been "obvious to try" the claimed invention, an unacceptable basis for rejection.

[1][2] We agree. The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. *See In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed.Cir.1984). It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed.Cir.1984); *see also Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297 n. 24, 227 USPQ 657, 667 n. 24 (Fed.Cir.1985); *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed.Cir.1984). This it has not done. The Board points to nothing in the cited references, either alone or in combination, suggesting or teaching Fine's invention.

The primary basis for the Board's affirmance of the Examiner's rejection was that it would have been obvious to substitute the Warnick nitric oxide detector for the Eads sulfur dioxide detector in the Eads system. The Board reiterated the Examiner's bald assertion that "substitution of one type of detector for another in the system of Eads would have been within the skill of the art," but neither of them offered any support for or explanation of this conclusion.

Eads is limited to the analysis of sulfur compounds. The particular problem addressed there is the difficulty of obtaining precise measurements of sulfur compounds because of the tendency of sulfur dioxide to adhere to or react with the sampling analytic equipment or the liquid or gaseous materials in the equipment. It solves this problem by suggesting that the gaseous sample containing sulfur compounds be absorbed into sulfur-free methanol and then inserted into a gas chromatograph to separate the sulfur compounds.

There is no suggestion in Eads, which focuses on the unique difficulties inherent in the measurement of sulfur, to use that arrangement to detect nitrogen compounds. In fact, Eads says that the presence of nitrogen is undesirable because the concentration of the titration cell components in the sulfur detector is adversely affected by substantial amounts of nitrogen compounds in the sample. So, instead of suggesting that the system be used to detect nitrogen compounds, Eads deliberately seeks to avoid them; it warns against rather than teaches Fine's invention. *See W.L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed.Cir.1983) (error to find obviousness where references "diverge from and teach away from the invention at hand"). In the face of this, one skilled in the art would not be expected to combine a nitrogen-related detector with the Eads system. Accordingly, there is no suggestion to combine Eads and Warnick.

Likewise, the teachings of Warnick are inconsistent with the claimed invention, to some extent. The Warnick claims are directed to a gas stream from engine exhaust "continuously flowing the gaseous mixtures into the reaction chamber" to obtain " continuous readouts" of the amount of nitric oxide in the sample. In other words, it contemplates measuring the total amount of nitric oxide in a continuously flowing gaseous mixture of unseparated nitrogen constituents. By contrast, in Fine each *1075 nitrogen compound constituent of the gaseous sample is retained in the chromatograph for an individual time period so that each exits in discrete, time-separated pulses.[FN*] By this

process, each constituent may be both identified by its position in time sequence, and measured. The claimed system, therefore, diverges from Warnick and teaches advantages not appreciated or contemplated by it.

> FN* The Solicitor argues that the contents of Attachment C of Fine's brief were not before the Board and may not properly be considered here. However, we need not rely on Attachment C. It is merely illustrative of the qualitative separation of nitrogen compounds which occurs in Fine's system. The fact that the various constituents exit at discrete intervals is shown by the specification which was before the Board and which may appropriately be considered on appeal. *See, e.g., Astra-Sjuco, A.B. v. United States Int'l Trade Comm'n,* 629 F.2d 682, 686, 207 USPQ 1, 5 (CCPA 1980) (claims must be construed in light of specification).

[3] Because neither Warnick nor Eads, alone or in combination, suggests the claimed invention, the Board erred in affirming the Examiner's conclusion that it would have been obvious to substitute the Warnick nitric oxide detector for the Eads sulfur dioxide detector in the Eads system. *ACS Hosp. Sys.,* 732 F.2d at 1575-77, 221 USPQ at 931-33. The Eads and Warnick references disclose, at most, that one skilled in the art might find it obvious to try the claimed invention. But whether a particular combination might be "obvious to try" is not a legitimate test of patentability. *In re Geiger,* 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed.Cir.1987); *In re Goodwin,* 576 F.2d 375, 377, 198 USPQ 1, 3 (CCPA 1978).

Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller,* 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.,* 732 F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined *only* if there is some suggestion or incentive to do so." *Id.* Here, the prior art contains none.

Instead, the Examiner relies on hindsight in reaching his obviousness determination. But this court has said, "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore,* 721 F.2d at 1553, 220 USPQ at 312-13. It is essential that "the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made ... to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *Id.* One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

C. Advantage Not Appreciated by the Prior Art.

[4] The Board erred not only in improperly combining the Eads and Warnick references but also in failing to appreciate that the appealed claims can be distinguished over that combination. A material limitation of the claimed system is that the conversion to nitric oxide occur in the range of 600° > C to 1700°C. The purpose of this limitation is to prevent nitrogen from other sources, such as the air, from being converted to nitric oxide and thereby distorting the measurement of nitric oxide derived from the nitrogen compounds of the sample.

The claimed nitric oxide conversion temperature is not disclosed in Warnick. Although Eads describes a preferred temperature of 675°C to 725°> C, the purpose of this range is different from that of Fine. Eads requires the 675°C to 725°C range because it affords a temperature low enough to avoid formation of unwanted sulfur trioxide, yet high enough to avoid formation of unwanted sulfides. Fine's temperature *1076 range, in contrast, does not seek to avoid the formation of sulfur compounds

or even nitrogen compounds. It enables the system to break down the nitrogen compounds of the sample while avoiding the destruction of background nitrogen gas. There is a partial overlap, of course, but this is mere happenstance. Because the purposes of the two temperature ranges are entirely unrelated, Eads does not teach use of the claimed range. *See In re Geiger,* 815 F.2d at 688, 2 USPQ2d at 1278. The Board erred by concluding otherwise.

D. Unexpected Results.

Because we reverse for failure to establish a *prima facie* case of obviousness, we need not reach Fine's contention that the Board failed to accord proper weight to the objective evidence of unexpected superior results. *Id.*

E. The "Flame" Claims.

Claims 62, 68, 69, 79, 85 and 86 relate to the oxygen-rich flame conversion means of the claimed invention. These "flame" claims depend from either apparatus claim 60 or method claim 77. Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious. *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.,* 819 F.2d 1100, 1108, 2 USPQ2d 1826, 1831 (Fed.Cir.1987); *In re Abele,* 684 F.2d 902, 910, 214 USPQ 682, 689 (CCPA 1982); *see also In re Sernaker,* 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed.Cir.1983). In view of our conclusion that claims 60 and 77 are nonobvious, the dependent " flame" claims are also patentable.

CONCLUSION

The Board's decision affirming the Examiner's rejection of claims 60, 62, 63, 68, 69, 77, 79, 80, 85 and 86 of Fine's application as unpatentable over the prior art under 35 U.S.C. § 103 is

REVERSED.

EDWARD S. SMITH, Circuit Judge, dissenting.

I respectfully dissent. I am of the firm belief that the prior art references, relied upon by the PTO to establish its prima facie case of obviousness, in combination teach and suggest Fine's invention to one skilled in the art. Also, I firmly believe that Fine failed to rebut the PTO's prima facie case. On this basis, I would affirm the board's determination sustaining the examiner's rejection, pursuant to 35 U.S.C. § 103, of Fine's claims on appeal before this court.

C.A.Fed.,1988.
In re Fine
837 F.2d 1071, 5 U.S.P.Q.2d 1596

END OF DOCUMENT

490 F.2d 981, 180 U.S.P.Q. 580
(Cite as: 490 F.2d 981)

C
Application of Royka,
Cust. & Pat.App.,1974.

United States Court of Customs and Patent Appeals.
Application of Stephen F. ROYKA and Robert G. Martin.
Patent Appeal No. 9092.

Feb. 7, 1974.

Appeal from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of patent application, Serial No. 648,701, for a ' responsive answer system.' The Court of Customs and Patent Appeals, Rich, J., held that an answer sheet for use in self-instruction and testing, in which were printed in 'response areas' meaningful information in permanent printing and confusing information in printing which could be removed, as by an erasure, both being legible so that a student, seeing a choice of answers to a question, was required to make a selection, the correctness of the selection being shown by the information which was then removed by the erasure, was not anticipated by prior patents and was therefore patentable.

Reversed.
West Headnotes
Patents 291 ⇐66(1.20)

291 Patents
291II Patentability
291II(D) Anticipation
291k63 Prior Patents
291k66 Operation and Effect
291k66(1.20) k. Measuring, Testing, and Indicating-Devices. Most Cited Cases
"Responsive answer system," answer sheet for use in self-instruction and testing, in which were printed in "response areas" meaningful information in permanent printing and confusing information in printing which could be removed, as by erasure, both being legible so that student, seeing a choice of answers to question, was required to make selection, correctness of selection being shown by information which was then removed by erasure, was not anticipated by prior patents and was therefore patentable. 35 U.S.C.A. §§.102, 103.

Patents 291 ⇐328(2)

291 Patents
291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents
291k328 Patents Enumerated
291k328(2) k. Original. Most Cited Cases

Patents 291 ⇐328(1)

291 Patents
291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents
291k328 Patents Enumerated
291k328(1) k. Design. Most Cited Cases
3,055,117, 3,364,857. Cited.

356,695. Cited.

*981 Michael H. Shanahan, Rochester, N.Y., of record, for appellant; Thomas M. Webster, Rochester, N.Y., Boris Haskell, Washington, D.C. (Paris, Haskell & Levine), Washington, D.C., of counsel.
Joseph F. Nakamura, Washington, D.C., for the Commissioner of Patents. Fred W. Sherling, Washington, D.C., of counsel.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, judges.
RICH, Judge.
This appeal is from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of claims 28 and 30-36 of application serial No. 648,701, filed June 26, 1967, entitled 'Responsive Answer System.' We reverse.

490 F.2d 981, 180 U.S.P.Q. 580
(Cite as: 490 F.2d 981)

The Invention

The appealed claims are directed to a device in the nature of an answer sheet for use in self-instruction and testing. The answer sheet may be associated with questions or separate therefrom. The essential features of the invention are that there are printed on the answer sheet in 'response areas' meaningful information in permanent printing and confusing information in printing which can be removed, as by an eraser, both being legible so that a student, seeing a choice of answers to a question, must make a selection. Having made a selection, he then applies an eraser to the selected response area and some of the information will be readily removed. What remains advises him of the correctness or otherwise of his answer. The following figures from the drawings are illustrative:

PERMA	PERMA
NENT	NENT
MEANI	MEANI
NGFUL	NGFUL
INFORM	INFOR
ATION	MATION
PLUS	
REMO	
VABLE	
CONFU	
SING	
INFOR	
MATION	
A. TRUE	A.
Y NO	Y
E	E
S	S
WRONG	
B. FALSE	B.
N YES	N
O	O
RIGHT	
FIG.IA	FIG.IB

Fig. 1A shows two response areas to a given question before any removing action*982 by the student has taken place and Fig. 1B shows the

permanent information remaining in each after erasure of the removable information. Of course, if the student makes an initial choice of area A, showing up 'YES' or some other indication of a correct answer, he will not need to proceed further and erase the B area. In a modified form of the invention, a wrong selection, plus erasure, may expose, instead of or in addition to a statement that the answer is wrong, a number or other reference to further material which is to be studied.

A preferred method of printing the permanent meaningful information and the removable confusing information is by that type of xerography in which a fusible toner is used, the permanence of the printing depending on the extent to which the toner image is 'fixed' or fused by heat. By successive printings of the two kinds of information with fixing to different degrees, one image can be made permanent and the other made subject to easy removal, both images retaining such similarity of appearance that the user of the answer sheet cannot tell them apart.

Claim 28 is the principal claim, all others being dependent thereon, and reads as follows:

28. A device for selectively indicating information comprising

a support having response areas for presenting information for selection,

permanent printing indicative of meaningful information permanently fixed to said support within a response area, and

removable printing indicative of confusing information removably fixed to said support within a response area,

said meaningful and confusing information being substantially legible even when said permanent and removable printing are fixed over one another on said support,

said permanent and removable printing being substantially similar such that an observer cannot determine which information is permanent and which is removable

whereby the information within a response area is selected by attempting to remove the printing therein with the failure to remove printing identifying meaningful information.

Claims 30-36 add limitations which need not be considered except for noting that claims 33 and 34 alone specify the use of a xerographic toner, for which reason they were rejected on a different ground from the other claims.

The Rejection

The following references were relied on:

Reid et al. (Reid)	356,695	Jan. 25, 1887
Bernstein et al. (Bernstein)	3,055,117	Sep. 25, 1962
Lein et al. (Lein)	3,364,857 (filed Feb. 2, 1966)	Jan. 23, 1968

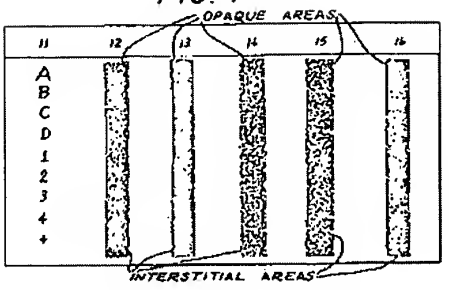
Claims 28, 30, 31, and 32 were rejected as anticipated under 35 U.S.C. § 102 by Bernstein; claims 28, 31, 32, 35, and 36 were rejected as anticipated under § 102 by Reid; and claims 33 and 34 were rejected under 35 U.S.C. § 103 for obviousness, on either Bernstein or Reid in view of Lein. These were the examiner's rejections and the board affirmed them, adhering to its decision on reconsideration.

Bernstein discloses an answer sheet in which printed information representing a response is ' temporarily concealed from the observer' and he discloses a number of different ways of effectively concealing the response. His specification states:

The objects of the invention are accomplished by utilizing the hiding media to confuse the participant and to render the response and the hiding media indistinguishable and thus conceal the presence, absence, nature or position of the response from the participant. This may be effectuated by careful attention being paid to a number of factors including the design, *983 color and position of the hiding or confusing media.

Fig. 1 of Bernstein's drawings, illustrates some of his concealing means:

FIG. 1



The following is the written description:

Referring now to the drawing, FIG. 1 illustrates some of the many optically confusing patterns which may be positioned between the printed structure to be concealed and the point of observation. Column 11 shows the information which is to be concealed. This information is repeated in columns 12 through 16 but in each case is concealed by a pattern in accordance with the present invention. Column 12 utilizes a pattern comprising an alphabetical maze in both line and half tone screen. Column 13 utilizes a pattern comprising an absorbing field having a plurality of irregular dot-like interstices. Column 14 utilizes a pattern comprising a maze of plus signs combined with dots. Columns 15 and 16 illustrate irregular and non-repetitious patterns.

Bernstein says that if at least 50% Of the response is actually covered by the opaque portions of the confusion pattern, complete concealment is obtained. He also says that added means of concealment may be used, such as scoring and embossing and perforating the paper in order to scatter the light or let it shine through.

Reid is entitled 'Transformation Picture and Print.' The invention is said to be useful for advertisements, Christmas cards, birthday cards, valentines, and the like and as a source of amusement and instruction for children. It consists of a picture or print, part of which is permanently printed and part of which is removable from the paper on which it is printed. For the latter various soluble undercoatings or inks are described. If the picture is washed with a solvent, which may be water, the removable part disappears and the pictorial and/or typographic matter changes. The invention is illustrated by a typical nineteenth century temperance propaganda piece depicting the evils of drink. In the finished picture there are three scenes from left to right: Scene 1, the innocent child leads her father home from the pub; Scene 2, Father sits slumped in the kitchen chair with his bottle beside him, the family wash hanging above his head, this picture being entitled 'The Effects of Drink'; Scene 3, Mother stands in front of a sign reading 'Pawn Shop.' Across the bottom of the picture is a legend which says 'Wash the above and see what water will do.'Fig. II shows the result of washing with water: Scene 1, a handsome young man and his happy daughter stroll on the street; Scene 2, Father sits erect in a well-appointed room at a clothcovered table, apparently having a cup of tea, obviously a gentleman; Scene 3, Mother beams from the sideline and the Pawn Shop sign has vanished. Two new subscriptions appear and the words 'The' and 'Drink' have disappeared, the resultant being a new picture title reading 'The Beneficial Effects of Temperance.' 'The Beneficial ' and 'Temperance' were covered by some soluble opaque in the original picture. No doubt the overall effect is instruction. Perhaps there was amusement in bringing about the transformation.

Lein relates to xerography and is relied on only for its disclosure of the removability of partially fused

toner and the permanence of fully fused toner.

OPINION

As to the § 102 anticipation rejections, it will suffice to consider independent claim 28. If it is not fully met by Reid *984 or Bernstein, neither are the more limited dependent claims. It is elementary that to support an anticipation rejection, all elements of the claim must be found in the reference. We do not find claim 28 anticipated by Bernstein because, as we read the claim, it requires the display of legible meaningful and legible confusing information simultaneously, between which the user of the device may make a selection before he undertakes to remove any of the information from the response area selected by him. The element we find most clearly missing, contrary to the reasoning of the examiner and the board, is the legible confusing information. The Patent Office proposes to read this limitation on Bernstein's confusion patterns which are nothing but meaningless obscuring screens, conveying no information and providing the user with no basis for making a selection, as called for by claim 28. In appellants' device the legible confusing information- i.e., the wrong answers- are legible in the sense that they can be read as intelligible words, not merely a jumble of type serving to obscure the words of the wrong answers.

Appellants were fully aware of Bernstein and discussed its disclosures in their specification, distinguishing from this and other prior art, saying, in part:

The inventive concept hereof confuses not by physical blocking as taught by the prior art, but by compounding, associating (including disarranging) permanent information with confusing information, usually at least some of which is similar in character to the permanent information as to render it impossible to tell which is permanent and which is removable confusing information. In the invention, generally no attempt is made to designedly physically cover the permanent information, but to confuse it beyond interpretation by the presentation of extraneous removable, confusing information.

Claims are not to be read in a vacuum and while it is true they are to be given the broadest reasonable interpretation during prosecution, their terms still have to be given the meaning called for by the specification of which they form a part. We cannot read the terms 'legible' and 'information' on Bernstein's confusion patterns, as did the examiner and the board. They are not 'legible,' as appellants use the term, and they convey no information.

As to anticipation by Reid, we find neither appellants' basic concept nor the substance of claim 28 to be disclosed. Apparently the solicitor could find little to support the rejection in Reid for all he says in his brief- so far as claim 28 is concerned- is:

Reid discloses a sheet which may be used for instruction and which may have a removable design partly covering a fixed design * * *. Therefore, the disclosure of the reference encompasses the arrangement wherein a removable design covers a fixed design with both designs being substantially legible.

But claim 28 does not call for an arrangement wherein a removable design covers a fixed design. It calls for response areas, which Reid does not have, containing meaningful information in permanent printing together with removable printing conveying confusing information, both legible at the same time, between which a 'selection ' can be made. The only choice offered to the user by Reid is to follow the instruction to wash the whole visible picture with water or other solvent, thus removing the overprinting, to discover what the permanent picture is. The Patent Office attempt to read claim 28 on this reference is a tour deforce. We hold that Reid does not anticipate for failure to meet the limitations of claim 28 to 'response areas,' to the presentation of two categories of information (meaningful-permanent and removable-confusing) within such areas, and the possibility of selection. Anticipation requires a finding that the claimed invention be disclosed. It is not enough to say that appellants' invention and the reference are *985 both usable for instruction and both consist of permanent and removable printings on paper, as did the solicitor.

The dependent claims rejected with claim 28, as anticipated under § 102, are not anticipated since claim 28 is not anticipated. Some of them merely add features which are disclosed by the references and some do not. Insofar as they do not, they further negative anticipation. The examiner recognized this fact as to claims 33 and 34, which are limited to xerography, and therefore did not reject them under § 102. Similarly, he did not reject claim 30 on Reid or claims 35 and 36 on Bernstein. We find that claims 35 and 36 contain limitations which additionally distinguish from Reid. We have already noted that Reid had no ' response areas' as required by claim 28 and so Reid does not disclose the structure of claim 35 which additionally requires both the correct and incorrect answers to appear within the same response area.

As to claim 36, the examiner said it 'is merely a printed matter variation of the design of the reference,' Reid. This is not a valid reason for rejection. Printed matter may very well constitute structural limitations upon which patentability can be predicated. We have commented on this matter In re Jones, 373 F.2d 1007, 54 CCPA 1218 (1967); and In re Miller, 418 F.2d 1392, 57 CCPA 809 (1969), and will not repeat ourselves. The limitations of claim 36 are not remotely suggested by Reid.

There remains the § 103 rejection of claims 33 and 34. Do they, taken together with all of the limitations of claim 28 from which they depend, define obvious subject matter? The difference between claim 28 and these two dependent claims is that they add the limitations to xerography. If Bernstein and Reid showed the claimed invention except for xerography, the addition of the Lein reference would make the subject matter of the claims obvious. But that is not the situation here. Adding the knowledge of xerographic technology to Bernstein or Reid still does not make the invention of claims 33 and 34 obvious for the same reasons we have given above in discussing anticipation. The essence of appellants' invention, as set forth in claim 28, is still missing notwithstanding the addition of the Lein reference and we see nothing in the combinations of references which would have made the invention obvious to one of ordinary skill in the art at the time it was made. We will, therefore, reverse this rejection.

The decision of the board is reversed.

Reversed.

Cust. & Pat.App.,1974.
Application of Royka
490 F.2d 981, 180 U.S.P.Q. 580

END OF DOCUMENT

559 F.2d 618, 195 U.S.P.Q. 6
(Cite as: 559 F.2d 618)

C
Application of Antonie,
Cust. & Pat.App. 1977.

United States Court of Customs and Patent Appeals.
Application of Ronald L. ANTONIE.
Patent Appeal No. 76-681.

Decided Aug. 18, 1977.

Appeal was taken from a decision of the Patent and Trademark Office Board of Appeals, Serial No. 331,796, affirming the rejection of claims 1, 2 and 3 of an application for "Rotating Biological Contactor Apparatus" as obvious. The Court of Customs and Patent Appeals, Baldwin, J., held that the claims were not obvious in light of prior art.

Reversed.

Miller, J., concurred in the result.

Herbert N. Maletz, J., filed a dissenting opinion in which Rich, J., joined.

West Headnotes

[1] Patents 291 ⇐16(1)

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k16 Invention and Obviousness in General
291k16(1) k. In General. Most Cited Cases
(Formerly 291k18)

In determining whether invention as a whole would have been obvious in light of prior art, court must first delineate invention as a whole and, in delineating invention as a whole, court looks not only to subject matter which is literally recited in claim in question, but also to those properties of subject matter which are inherent in subject matter and are disclosed in specification. (Per Baldwin, J., with one Judge concurring and one Judge concurring in result.)

[2] Patents 291 ⇐16.17

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k16.17 k. Mechanical Devices. Most Cited Cases
(Formerly 291k18)

Claims 1, 2 and 3 of application for "Rotating Biological Contactor Apparatus" were not obvious in light of prior art. (Per Baldwin, J., with one Judge concurring and one Judge concurring in result.) 35 U.S.C.A. § 103.

[3] Patents 291 ⇐16.14

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k16.14 k. Miscellaneous Inventions. Most Cited Cases
(Formerly 291k18)

Fact that it was obvious to one of ordinary skill in art to try varying every parameter of system in order to optimize effectiveness of system did not establish that system using a particular parameter was obvious in light of prior art. (Per Baldwin, J., with one Judge concurring and one Judge concurring in result.) 35 U.S.C.A. § 103.

Patents 291 ⇐328(2)

291 Patents
291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents
291k328 Patents Enumerated
291k328(2) k. Original Utility. Most Cited Cases

3,335,081. Cited as prior art.

*618 Arthur H. Seidel, Thomas W. Ehrmann,

Milwaukee, Wis. (Quarles & Brady, Milwaukee, Wis.), attorneys of record, for appellant.
Joseph F. Nakamura, Washington, D. C., for the Commissioner of Patents, R. D. Edmonds, Washington, D. C., of counsel.

Before MARKEY, Chief Judge, RICH, BALDWIN and MILLER, Judges, and HERBERT N. MALETZ, Judge, United States Customs Court.
BALDWIN, Judge.
This is an appeal from a decision of the Patent and Trademark Office (PTO) Board of Appeals (board) affirming the rejection of claims 1, 2 and 3 of an application for "Rotating Biological Contactor Apparatus" [FN1] as obvious under 35 U.S.C. s 103 in view of El-Naggar.[FN2] We reverse.

FN1. Serial No. 331,796, filed February 12, 1973.

FN2."Method of Treatment of Sewage by Bio-Oxidation and Apparatus Therefor," U.S. Patent No. 3,335,081, issued August 8, 1967.

The Invention

Appellant claims a wastewater treatment device in which wastewater is continuously passed through a tank. Semi-immersed contactors (disks) are continuously rotated to aerate their immersed portions and thereby to aerate both microorganisms that grow on the contactors and the wastewater itself. For this discussion, several variables are important in this device. "Throughput" is the volume of wastewater per unit time (gal./day) which the device must treat. "Contactor area" is the total area of the contactors which is exposed to the wastewater as the contactors are rotated (sq. ft.). " Tank volume" is the actual volume of liquid in the tanks in which the contactors *619 rotate (gal.). The ratio of throughput to contactor area (gal./ day/sq. ft.) is called the "hydraulic loading." Two concepts of effectiveness of the equipment are important in this discussion. The primary prior art reference uses the term "efficiency" to denote the percent impurity reduction which a given set-up of the device achieves and we shall so use the term. Appellant uses the term "maximum treatment capacity" to denote when a unit of contactor area is providing maximum "efficiency" for a given " throughput" or maximum "throughput" for a given " efficiency." It is essential to understand the distinction between "efficiency," a matter of ultimate effectiveness independent of the efficiency of the equipment, and "treatment capacity," a matter of the efficiency or effectiveness of a unit of contactor area. The latter is more properly associated with the normal use of the term " efficiency" denoting maximum result from a limited resource.

Appellant's claimed device has a ratio of tank volume to contactor area of 0.12 gal./sq. ft.[FN3] Appellant maintains that this ratio is the most desirable or optimum for all set-ups of the device in the sense that using a lower value gives lower " treatment capacity" and using a greater value gives no increase in "treatment capacity," merely increasing costs. Thus, the value is optimum in that it maximizes "treatment capacity" so that the effectiveness of a given contactor is maximized.

FN3. Claims 1 and 2 recite "at least about 0.12" while claim 3 recites "about 0.12."

The Prior Art

El-Naggar teaches the basic structure of the device claimed by appellant but is silent regarding quantitative design parameters other than to give data on a single example, which data was apparently complete except for any discussion of "tank volume. " El-Naggar stated the "efficiency" (obviously referring to the purity of the output) could be increased to 95% by increasing the area of the contactor.

The Rejection

The examiner rejected the claims as obvious under 35 U.S.C. s 103, noting that the basic device in question is old as taught by El-Naggar. While the ratio of tank volume to contactor area of 0.12 gal./sq. ft. is not disclosed in El-Naggar, the

examiner reasoned that the disclosure of El-Naggar would make a device with that optimum value obvious. The examiner noted that El-Naggar suggests increasing the "efficiency" (degree of purification) of his device by increasing the contactor area while apparently keeping the " throughput" constant, that is, reducing the " hydraulic loading." The examiner then assumed that El-Naggar teaches keeping the tank volume constant while increasing the contactor area. Thus, the examiner argued that the idea of increasing tank volume to surface area to increase efficiency is taught and that working out the value for optimum efficiency is mere mechanical experimentation. The board accepted the examiner's reasoning.

OPINION

[1] In determining whether the invention as a while would have been obvious under 35 U.S.C. s 103, we must first delineate the invention as a whole. In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question (the ratio value) but also to those properties of the subject matter which are inherent in the subject matter and are disclosed in the specification.In re Davies,475 F.2d 667, 177 USPQ 381 (CCPA 1973). In this case, the invention as a whole is the ratio value of 0.12 and its inherent and disclosed property. That property is that the described devices designed with the ratio will maximize treatment capacity regardless of the values of the other variables in the devices. Just as we look to a chemical and its properties when we examine the obviousness of a composition of matter claim, it is this invention as a whole, and not some part of it, which must be obvious under 35 U.S.C. s 103. Cf. In re Papesch, 50 CCPA 1084, 315 F.2d 381, 137 USPQ 43 (1963).

*620 [2] The controlling question is simply whether the differences (namely the value of 0.12 and its property) between the prior art and appellant's invention as a whole are such that appellant's invention as a whole would have been obvious. The answer is no. It is impossible to recognize, from the experiment taught by El-Naggar, that "treatment capacity" is a function of "tank volume" or the tank volume-to-contactor area ratio. Recognition of this functionality is essential to the obviousness of conducting experiments to determine the value of the "tank volume" ratio which will maximize treatment capacity. Such functionality can only be determined from data representing either efficiency at varying tank volume, fixed throughput, and fixed contactor area or throughput at varying tank volume, fixed efficiency, and fixed contactor area. Each of these experiments represents treatment capacity with fixed contactor area but varying tank volume. This sort of experiment would not be suggested by the teachings of El-Naggar since he was not trying to maximize or control "treatment capacity." The experiments suggested by El-Naggar do not reveal the property which applicant has discovered, and the PTO has provided us with no other basis for the obviousness of the necessary experiments.

[3] The PTO and the minority appear to argue that it would always be obvious for one of ordinary skill in the art to try varying every parameter of a system in order to optimize the effectiveness of the system even if there is no evidence in the record that the prior art recognized that particular parameter affected the result.[FN4] As we have said many times, obvious to try is not the standard of 35 U.S.C. s 103.In re Tomlinson, 363 F.2d 928, 53 CCPA 1421, 150 USPQ 623 (1966). Disregard for the unobviousness of the results of "obvious to try" experiments disregards the "invention as a whole" concept of s 103, In re Dien, 371 F.2d 886, 54 CCPA 1027, 152 USPQ 550 (1967) and In re Wiggins, 397 F.2d 356, 55 CCPA 1356, 158 USPQ 199 (1968), and overemphasis on the routine nature of the data gathering required to arrive at appellant's discovery, after its existence became expected, overlooks the last sentence of s 103.In re Saether, 492 F.2d 849, 181 USPQ 36 (CCPA 1974).

FN4. The precise nature of the El-Naggar experiment and the nature of the data which would result are rendered hopelessly speculative by El-Naggar's total failure to discuss the critical matter of what is done with the volume of the tank. The PTO appears to assume, as a necessary element

> of its conclusion, that appellant's ratio is the inevitable result of El-Naggar experiment, and that the tank volume is fixed, apparently because El-Naggar does not suggest changing the tank as additional contactor area is supplied. Even if the same tank were used, the actual liquid volume of the tank could change significantly if 1) the tank has a level control, 2) the tank is not extremely large in comparison to the contactors and 3) the volume-to-area ratio of the contactors themselves is significant. Since these assumptions are not unreasonable, there is serious doubt as to the constant volume of the tank.

Whether one would inevitably arrive at the ratio value of 0.12 or above depends on facts which must be read into El-Naggar, (e. g., the volume of the tank) and on assumptions about the kind of motivation (e. g., the degree of "efficiency" which would be sought). All of this involves, at least on this record, mere speculation. Assuming, as the examiner has, that the tank volume is fixed and the natural motivation is to maximize efficiency, if El-Naggar's equipment has a tank volume to contactor area ratio of less than 0.12, and the resulting efficiency is found wanting, increasing the contactor area to increase "efficiency" will lead away from the claimed ratio.

In In re Aller, 220 F.2d 454, 42 CCPA 824,105 USPQ 233 (1955), the court set out the rule that the discovery of an optimum value of a variable in a known process is normally obvious. We have found exceptions to this rule in cases where the results of optimizing a variable, which was known to be result effective, were unexpectedly good.In re Waymouth, 499 F.2d 1273, 182 USPQ 290 (CCPA 1974); In re Saether, supra. This case, in which the parameter optimized was not recognized to be a result-effective variable, is another exception. The decision of the board is reversed.

REVERSED.

MILLER, J., concurs in the result.
621 HERBERT N. MALETZ, Judge,[FN] dissenting, with whom RICH, Judge, joins.

> FN* Judge of the United States Customs Court sitting by designation pursuant to 28 U.S.C. s 293(d).

With all due respect, I cannot agree with the majority's interpretation of the El-Naggar patent. El-Naggar discloses the same wastewater treatment apparatus as claimed, except for the specific volume-to-surface ratio of .12 gallons per square foot as recited in the claims. However, El-Naggar generally discloses varying the number of disks (column 3, lines 31-35), the number of concentric cylinders (column 4, lines 27-30), or the length of the cylinders (column 4, lines 61-62) in his apparatus in order to optimize results. Given the basic apparatus of El-Naggar and the concept of varying the number of disks in a tank in order to optimize impurity removal, I believe that it would have been well within the capabilities of the chemical engineer of ordinary skill to determine empirically, by routine experimentation, the optimum design ratio which appellant has determined and recited in his claims. That is, El-Naggar set the way, and appellant's work was what any routineer would have accomplished in following the patent teachings.

Appellant urges that the results which he determined empirically by plotting the effect of volume-to-surface ratio on impurity removal, including the specific, optimum design ratio of .12 gallons per square foot, could not have been predicted from El-Naggar. However, obviousness under 35 U.S.C. s 103 does not require absolute predictability, In re Kronig, 539 F.2d 1300, 190 USPQ 425 (CCPA 1976), and it is sufficient here that El-Naggar clearly led the way for the routineer to arrive at the claimed apparatus.

I am in substantial agreement with the board's analysis of this case, and I would affirm the board's decision.

Cust. & Pat.App. 1977.
Application of Antonie
559 F.2d 618, 195 U.S.P.Q. 6

END OF DOCUMENT

W.L. GORE & ASSOCIATES, INC., Appellant/Cross-Appellee,

v.

GARLOCK, INC., Appellee/Cross-Appellant.

Nos. 83-613, 83-614.

United States Court of Appeals, Federal Circuit.

Nov. 14, 1983.

Patentee brought infringement action, and accused infringer counterclaimed for declaratory judgment of patent invalidity, noninfringement, fraudulent solicitation, and entitlement to attorney fees. The United States District Court for the Northern District of Ohio entered judgment holding patents invalid, and patentee appealed. The Court of Appeals, Markey, Chief Judge, held that: (1) claims 1 and 17 of patent No. 3,953,566 directed to processes for stretching highly crystalline, unsintered teflon were invalid; (2) accused infringer had not met burden of showing that claims 1, 9, 12, 14, 18, 35, 36, 43, 67, and 77 of patent No. 4,187,390 directed to products obtained by the processes of the companion patent had been anticipated by prior art; (3) accused infringer failed to prove that at time application was filed, specification was not enabling or that claims were indefinite; (4) accused infringer failed to sustain burden of proving, by clear and convincing evidence, sufficient facts from which fraudulent intent could be inferred; (5) District Court did not abuse its discretion in denying accused infringer's request for attorney fees; and (6) better practice was for District Court to decide both validity and infringement issues.

Affirmed in part, reversed in part, and remanded.

Davis, Circuit Judge, concurred in result in part and dissented in part and filed opinion.

1. Patents ⇐165(2)

It is the patent claims that measure or define the invention, for purpose of determining patent validity. 35 U.S.C.A. § 112.

2. Patents ⇐16(1)

Each claimed invention must be considered as a whole in determining validity of patent. 35 U.S.C.A. § 103.

3. Patents ⇐16(1)

Court's restriction of claimed multistep process to one step constitutes error, whether done at behest of patentee relying on restriction to establish infringement by one who employs only that one step in a process otherwise distinct, or at behest of an accused infringer relying on that restriction to establish invalidity by showing that one step in a prior art process otherwise distinct. 35 U.S.C.A. §§ 102, 102(a, b), 103.

4. Patents ⇐62(1)

Finding that limitations of claim of patent directed to processes for stretching highly crystalline, unsintered teflon were met by patentee's operation, before asserted date of his invention, of teflon tape-stretching machine previously invented and patented by patentee's father was supported by record, for purpose of determining whether claim of patent was anticipated by operation of machine. 35 U.S.C.A. § 102(a).

5. Patents ⇐324.55(2)

Fact that district court, bound by precedent at time of trial, applied preponderance of the evidence test in determining claim of patent to have been anticipated by prior art did not render clearly erroneous standard inapplicable on patentee's appeal. 35 U.S.C.A. § 102(a); Fed.Rules Civ.Proc. Rule 52(a), 28 U.S.C.A.

6. Patents ⇐51(1)

Fact that those using patentee's invention for stretching teflon may not have appreciated results was irrelevant to determination of whether claim of patent was anticipated by operation of patented teflon tape-stretching machine in patentee's shop

before asserted date of patentee's invention. 35 U.S.C.A. § 102(a).

7. Patents ⇐51(2)

Nonsecret use of a claimed process in the usual course of producing articles for commercial purposes is a public use. 35 U.S.C.A. § 102(a).

8. Patents ⇐75

Manufacturer's use of previously invented machine for producing stretched and unstretched teflon thread seal tape was not a "public use" of processes subsequently claimed in patent directed to processes for stretching highly crystalline, unsintered teflon, notwithstanding that manufacturer allegedly did not keep machine hidden from employees legally bound to keep their knowledge confidential and notwithstanding that another company's employees were shown machine to see if they could help increase its speed, where there was no evidence that viewer of machine could thereby learn anything of which process, among all possible processes, the machine used. 35 U.S.C.A. §§ 102(b), 282.

9. Patents ⇐80

Manufacturer's and inventor's secret commercialization of whatever process was used in inventor's machine for producing stretched and unstretched teflon thread seal tape could not be held a bar to grant of patent to patentee on that process where, if manufacturer offered and sold anything, it was only tape and not whatever process was used in producing it, and there was no evidence that public could learn claimed process by examining tape. 35 U.S.C.A. § 102(b).

10. Patents ⇐90(2)

As between a prior inventor who benefits from process by selling its product but suppresses, conceals, or otherwise keeps process from public, and later inventor who promptly files patent application from which public will gain disclosure of process, law favors the latter. 35 U.S.C.A. § 102(b).

11. Patents ⇐16.8

Failure, in review of prior art with respect to patent directed to processes for stretching highly crystalline, unsintered teflon, to take into account import of markedly different behavior of such teflon from that of conventional thermoplastic polymers, consideration of patent claims in less than their entireties, and disregard of disclosures in prior art references that diverged from and taught away from invention at hand were error. 35 U.S.C.A. § 103.

12. Patents ⇐16.25

Disclosure in prior patents that unsintered teflon article could be stretched to as much as four times its length encompassed step of stretching to twice its length set forth in claim 17 of patent No. 3,953,566 directed to processes for stretching highly crystalline, unsintered teflon and established that such step would have been obvious, and thus claim was invalid. 35 U.S.C.A. § 103.

13. Patents ⇐112.1

Presumption of validity of patent has no separate evidentiary value; it cautions decision maker against rush to conclude invalidity, and submission of additional art that is merely "pertinent" does not dispel that caution. 35 U.S.C.A. § 103.

14. Patents ⇐312(1½)

Burden of persuasion remains throughout trial on one who would prove invalidity of patent. 35 U.S.C.A. §§ 103, 282.

15. Patents ⇐36.1(1)

Refusal to consider objective evidence of nonobviousness of processes taught by patent was error. 35 U.S.C.A. § 103.

16. Patents ⇐312(6)

Accused infringer failed to meet burden of proving that invention which was subject of claims of patent directed to processes for stretching highly crystalline, unsintered teflon and teaching that such teflon could be stretched at a rate of about 100% per second or to more than five times its original length would have been obvious, even though individual parts of separate prior art references could be employed to recreate facsimile of claimed invention. 35 U.S.C.A. § 103.

17. Patents ⇐51(1)

Anticipation requires disclosure in a single prior art reference of each element of claim under consideration. 35 U.S.C.A. § 102.

18. Patents ⇐51(1)

Anticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting characteristics of products that might result from practice of processes disclosed in references. 35 U.S.C.A. § 102.

19. Patents ⇐66(1.24)

Teachings of prior art references were so unacceptably vague concerning characteristics of products produced by their respective processes as not to support anticipation rejection of claims of patent directed to products obtained by companion processes for stretching highly crystalline, unsintered teflon where neither of prior art references disclosed an invention set forth in any claim of subject patent, no inter partes tests in which processes taught by prior art references were conducted were of record, no products of those processes were placed in evidence, and "effect" of processes disclosed in prior art references was undisclosed in those patents. 35 U.S.C.A. § 102.

20. Patents ⇐66(1.24)

Accused infringer's employment of process covered by patent cited as prior art reference was irrelevant to determination of anticipation of claims of patent directed to products obtained by companion processes for stretching highly crystalline, unsintered teflon, even assuming cited patent was a dominating patent, where there was no basis for finding that cited process in itself necessarily and inherently resulted in products which were subject of claims of patent. 35 U.S.C.A. § 102.

21. Patents ⇐66(1.24)

Accused infringer's employment of process of dominating patent does not render that employment an anticipation of an invention described and claimed in an improvement patent. 35 U.S.C.A. § 102.

22. Patents ⇐62(1)

Accused infringer had not met burden of showing that claims of patent directed to products obtained by companion processes for stretching highly crystalline, unsintered teflon were anticipated by prior art preferences, neither of which disclosed an invention set forth in any claim of patent. 35 U.S.C.A. § 102.

23. Patents ⇐16(2)

Apparent assumption that products which were subject of patent claims, having been found inherent in processes of prior art references, would have been obvious in view of those references was error. 35 U.S.C.A. § 103.

24. Patents ⇐16(1)

Inherency and obviousness are distinct concepts for patent purposes. 35 U.S.C.A. § 103.

25. Patents ⇐36(1)

All evidence bearing on issue of obviousness, as with any other issue raised in conduct of judicial process, must be considered and evaluated before required legal conclusion is reached. 35 U.S.C.A. § 103.

26. Patents ⇐36(1)

Objective evidence of nonobviousness may in a given case be entitled to more weight or less, depending on its nature and its relationship to merits of invention, and it should when present always be considered as an integral part of analysis on obvious/nonobvious issue. 35 U.S.C.A. § 103.

27. Patents ⇐101(5)

A claim to a new product is not legally required to include critical limitations. 35 U.S.C.A. § 103.

28. Patents ⇐16.25

In view of difficulty of working with unsintered teflon and its unpredictable response to various processing techniques, vagueness of prior art references concerning products produced by those processes, and filling of at least two long-felt needs by and commercial success of claimed inventions, inventions set forth in claims of patent directed to products obtained by com-

panion processes for stretching highly crystalline, unsintered teflon would not have been obvious to those skilled in art at time those inventions were made. 35 U.S.C.A. § 103.

29. Patents ⇐1

Patents are written to enable those skilled in the art, not the public, to practice the invention. 35 U.S.C.A. § 112.

30. Patents ⇐99

Statute requiring that patents disclose sufficient information to enable a person of ordinary skill in the art to make and use the invention speaks as of the application filing date, not as of the time of trial. 35 U.S.C.A. § 112.

31. Patents ⇐99

Postfiling date development of varying formulae for calculating stretch rate of unsintered teflon was irrelevant to determination of whether patents directed to processes for stretching highly crystalline, unsintered teflon and products obtained by such processes disclosed sufficient information to enable person of ordinary skill in art to make and use invention, as required by statute. 35 U.S.C.A. § 112.

32. Patents ⇐99

Statute requiring that patents disclose sufficient information to enable person of ordinary skill in art to make and use invention requires that inventor set forth best mode of practicing invention known to him at time application was filed. 35 U.S.C.A. § 112.

33. Patents ⇐101(6)

Use of phrase "stretching * * * at a rate exceeding about ten percent per second" in claims of patent directed to processes for stretching highly crystalline, unsintered teflon was not indefinite, for purpose of assessment of infringement, where infringement was assessable through use of stopwatch. 35 U.S.C.A. § 112.

34. Patents ⇐101(4)

Absence from specification of patent directed to processes for stretching highly crystalline, unsintered teflon of a method for calculating minimum rate of stretch above 35 degrees centigrade did not render specification nonenabling, notwithstanding that minimum rate of stretch might increase with temperature, where calculation of minimum stretch rate above 35 degrees centigrade was not in claims of patent and particularly in absence of convincing evidence that those skilled in art would have found specification nonenabling at time application was filed. 35 U.S.C.A. § 112.

35. Patents ⇐99

It is the claimed invention for which enablement is required. 35 U.S.C.A. § 112.

36. Patents ⇐101(11)

Patents directed to processes for stretching highly crystalline, unsintered teflon and to products obtained by such processes were not invalid for indefiniteness on ground that some trial and error would be needed to determine lower limits of stretch rate above ten percent per second at various temperatures above 35 degrees centigrade where there was no evidence or finding that undue experimentation was required. 35 U.S.C.A. § 112.

37. Patents ⇐99

A patent is not invalid because of need for experimentation. 35 U.S.C.A. § 112.

38. Patents ⇐99

A patent is invalid only when those skilled in art are required to engage in undue experimentation to practice the invention. 35 U.S.C.A. § 112.

39. Patents ⇐165(1)

Distinguishing what infringes from what doesn't is role of patent claims, not of patent specification. 35 U.S.C.A. § 112.

40. Patents ⇐98

A patent applicant may be his own lexicographer.

41. Patents ⇐101(11)

In light of disclosure of its calculation in patent specification, term "matrix tensile strength" in claims of patents directed to processes for stretching highly crystalline, unsintered teflon and to products obtained

by such processes was neither indefinite nor nonenabling. 35 U.S.C.A. § 112.

42. Patents ⇐101(11)

Absence from specification of patents directed to processes for stretching highly crystalline unsintered teflon and to products obtained by such processes of a definition for "specific gravity of the solid polymer," which was a part of computation of matrix tensile strength, did not render that computation indefinite where there was no testimony that specific gravity values used in application were not known to persons of ordinary skill in art or could not be calculated or measured. 35 U.S.C.A. § 112.

43. Patents ⇐312(4)

Fraud on the Patent and Trademark Office must be shown by clear and convincing evidence.

44. Patents ⇐312(6)

Accused infringer failed to sustain burden of proving, by clear and convincing evidence, sufficient facts from which fraudulent intent could be inferred from patentee's representations to Patent and Trademark Office that stretching unsintered teflon tape at rate greater than ten percent per second was not novel and that it produced a physical phenomenon.

45. Patents ⇐312(6)

Finding in 1982 that teflon tape-stretching machine invented and patented by patentee's father inherently stretched tape at some time in 1969 at a rate more than ten percent per second did not establish that patentee of patents directed to processes for stretching highly crystalline, unsintered teflon and to products obtained by such processes was aware of that fact in 1975, nor make untrue his statement that to his knowledge such had not been the rate of stretch employed, for purpose of determining fraud on the Patent and Trademark Office.

46. Patents ⇐312(6)

Evidence of patentee's isolated statements did not support the conclusion, for purpose of determining fraud on the Patent and Trademark Office, that patentee of patents directed to processes for stretching highly crystalline, unsintered teflon and to products obtained by such processes attempted to convince PTO that a physical phenomenon always existed in which stretching at a rate greater than ten percent per second always produced a matrix tensile strength greater than 7,300 pounds per square inch.

47. Patents ⇐325.11(3)

Denial of accused infringer's request for attorney fees on counterclaim for declaratory judgment of patent invalidity in patentee's infringement action was not abuse of discretion.

48. Patents ⇐324.60

Where appellate court reverses a holding of invalidity, and remand is ordered for trial of factual issue of infringement, better practice is for district court to decide both validity and infringement issues when both are contested at trial, enabling conduct of single appeal and disposition of entire case in a single appellate opinion.

David H. Pfeffer, New York City, argued for appellant/cross-appellee; J. Robert Dailey and Janet Dore, New York City, John S. Campbell, Newark, Del., of counsel.

John J. Mackiewicz, Philadelphia, Pa., argued for appellee/cross-appellant. With him on the brief were Dale M. Heist, Philadelphia, Pa., Bernard Ouziel, New York City, of counsel.

Before MARKEY, Chief Judge, and DAVIS and MILLER, Circuit Judges.

MARKEY, Chief Judge.

Appeal from a judgment of the District Court for the Northern District of Ohio holding U.S. Patents 3,953,566 ('566) and 4,187,390 ('390) invalid. We affirm in part, reverse in part, and remand for a determination of the infringement issue.

Background

Tape of unsintered polytetrafluorethylene (PTFE) (known by the trademark

TEFLON of E.I. du Pont de Nemours, Inc.) had been stretched in small increments. W.L. Gore & Associates, Inc. (Gore), assignee of the patents in suit, experienced a tape breakage problem in the operation of its "401" tape stretching machine. Dr. Robert Gore, Vice President of Gore, developed the invention disclosed and claimed in the '566 and '390 patents in the course of his effort to solve that problem. The 401 machine was disclosed and claimed in Gore's U.S. Patent 3,664,915 ('915) and was the invention of Wilbert L. Gore, Dr. Gore's father. PTFE tape had been sold as thread seal tape, i.e., tape used to keep pipe joints from leaking. The '915 patent, the application for which was filed on October 3, 1969, makes no reference to stretch rate, at 10% per second or otherwise, or to matrix tensile strength in excess of 7,300 psi.

Dr. Gore experimented with heating and stretching of highly crystalline PTFE rods. Despite slow, careful stretching, the rods broke when stretched a relatively small amount. Conventional wisdom in the art taught that breakage could be avoided only by slowing the stretch rate or by decreasing the crystallinity. In late October, 1969, Dr. Gore discovered, contrary to that teaching, that stretching the rods as fast as possible enabled him to stretch them to more than ten times their original length with no breakage. Further, though the rod was thus greatly lengthened, its diameter remained virtually unchanged throughout its length. The rapid stretching also transformed the hard, shiny rods into rods of a soft, flexible material.

Gore developed several PTFE products by rapidly stretching highly crystalline PTFE, including: (1) porous film for filters and laminates; (2) fabric laminates of PTFE film bonded to fabric to produce a remarkable material having the contradictory properties of impermeability to liquid water and permeability to water vapor, the material being used to make "breathable" rainwear and filters; (3) porous yarn for weaving or braiding into other products, like space suits and pump packing; (4) tubes used as replacements for human arteries and veins; and (5) insulation for high performance electric cables.

On May 21, 1970, Gore filed the patent application that resulted in the patents in suit. The '566 patent has 24 claims directed to processes for stretching highly crystalline, unsintered, PTFE. The processes, *inter alia,* include the steps of stretching PTFE at a rate above 10% per second and at a temperature between about 35°C and the crystalline melt point of PTFE. The '390 patent has 77 claims directed to various products obtained by processes of the '566 patent.

It is effectively undisputed that the present inventions filled a long sought yet unfilled need. The United States Army and the research director of a Garlock, Inc. (Garlock) customer had been looking for and following up every remote lead to a waterproof/breathable material for many years.

It is undisputed that the present inventions enjoyed prompt and remarkable commercial success due to their merits and not to advertising or other extraneous causes.

It is undisputed that the inventions provide the most important synthetic material available for use in vascular surgery, hundreds of thousands of persons having received artificial arteries formed of the patented product since 1976, and that the patented products have unique properties useful in other medical procedures, in communications satellites, radar systems, and electrical applications.

It is undisputed that the major sources of PTFE, ICI and du Pont, greeted the patented product as "magical", "bewitching", "a remarkable new material", and one that "differs from other processed forms of Teflon".

It is undisputed that the patented products were met with skepticism and disbelief by at least one scientist who had worked with PTFE at du Pont for many years and who testified as an expert at trial.

It is undisputed that Garlock first produced an accused product in response to a customer's request for a substitute for the

patented product, that Garlock advertised its accused product as a "new form" of PTFE and as "a versatile new material which provides new orders of performance for consumer, industrial, medical and electrical applications", and that the customer describes that accused product as "a new dimension in rainproof/breathable fabrics".

Proceedings

On Nov. 2, 1979, Gore sued Garlock for infringement of process claims 3 and 19 of the '566 patent, and sought injunctive relief, damages, and attorney fees. Garlock counterclaimed on Dec. 18, 1979, for a declaratory judgment of patent invalidity, non-infringement, fraudulent solicitation, and entitlement to attorney fees. On Feb. 7, 1980, Gore filed a second suit for infringement of product claims 14, 18, 36, 43, 67 and 77 of the '390 patent. In light of a stipulation, the district court consolidated the two suits for trial.

Gore alleged infringement of certain claims by certain products:

'566 patent claims	'390 patent claims	Garlock Product
19	14, 43	film
--	36, 77	laminate
19	18	yarn
--	67	braided packing
8	--	tape

At trial, Garlock addressed only claims 1, 3, 17, and 19 of the '566 patent and claims 1, 9, 12, 14, 18, 35, 36, 43, 67, and 77 of the '390 patent. See Appendix to this opinion.

The district court, in a thorough memorandum accompanying its judgment, and in respect of the '566 patent: (1) found claim 1 anticipated under 35 U.S.C. § 102(a) by Gore's use of its 401 machine and use by the Budd Company (Budd) of a Cropper machine; (2) declared all claims of the patent invalid under 102(b) because the invention had been in public use and on sale more than one year before Gore's patent application, as evidenced by Budd's use of the Cropper machine; (3) held claims 1, 3, 17 and 19 invalid for obviousness under 35 U.S.C. § 103, on the basis of various reference pairings: (a) Japanese patent 13560/67 (Sumitomo) with U.S. patent 3,214,503 (Markwood); (b) U.S. patent 2,776,465 (Smith) with Markwood; or (c) Gore's '915 patent with Sumitomo; and (4) held all claims invalid as indefinite under 35 U.S.C. § 112.[1]

In its opinion respecting the '390 patent, the district court held: (1) claims 1, 9, 12, 14, 18, 35, 36, 43, 67 and 77 invalid under §§ 102 and 103 in view of Sumitomo and Smith; and (2) all claims invalid as indefinite under § 112.

1. 35 U.S.C. § 102(a) and (b) provide:

> A person shall be entitled to a patent unless—
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or ...

35 U.S.C. § 103 provides:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

35 U.S.C. § 112 provides:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.
>
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. A claim may be written in independent or dependent form, and if in dependent form, it shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.

The court found that Gore did not commit fraud before the Patent and Trademark Office (PTO), denied Garlock's request for attorney fees, and refrained from deciding the infringement issue.

Issues

Did the district court err in: (1) its holdings of invalidity under §§ 102(a), 102(b), 103 and 112; (2) its finding that Gore did not commit fraud on the PTO; or (3) denying attorney fees.

OPINION

This hard fought and bitterly contested case involved over two years of discovery, five weeks of trial, the testimony of 35 witnesses (19 live, 16 by deposition), and over 300 exhibits. The district court issued an exhaustive 37-page memorandum opinion reflective of a careful, conscientious approach to the determination of the many issues presented at trial.

The record on appeal consists of 2000 pages. The parties' briefs total 199 pages. In those briefs, counsel repeatedly accuse each other of numerous and serious breaches of the duty of candor owed the court. Each cites instances in which the testimony, the findings, and the record are or are said to be quoted in part and out of context. As a result, the usefulness and reliability of the briefs as means of informing the court has been greatly diminished if not destroyed, and careful, time-consuming study of all exhibits and each page of the record has been required.

Appellant cited 80 prior court opinions in its main brief. Appellee's brief totally ignores all but two of those citations, but adds 57 more. Appellant's reply brief cites 126 prior court opinions, 34 earlier cited, 67 newly cited, and 25 of those cited by appellee. Appellee's reply brief cites 17 prior court opinions, 4 earlier cited, 7 newly cited, and 6 of the 147 cited by appellant. Accordingly, 211 prior court opinions have been evaluated in relation to the proof found in the record.

In light of the entire record and the applicable law, we are convinced that Garlock failed to carry its burden of proving all claims of the present patents invalid.

Standard of Review

Where, as here, dispositive legal error occurred in interpretation and application of the patent statute, 35 U.S.C., the parties' arguments relating to the salutory injunction of Fed.Rule Civ.P. 52(a) cannot be controlling on all issues. Findings that "rest on an erroneous view of the law may be set aside on that basis", *Pullman-Standard v. Swint*, 456 U.S. 273, 102 S.Ct. 1781, 42 L.Ed.2d 66 (1982). Thus it is unnecessary here to set aside any probative fact found by the district court on the basis of its being clearly erroneous, or to engage in what would be an inappropriate reweighing of the facts.

Among the legal errors extant in the record, each of which is discussed below, are (1) the invention set forth in each claim was not in each instance considered as a whole; (2) 35 U.S.C. § 102(b) was applied though criteria for its application were not present; (3) the references were not assessed in their entireties; (4) an inherency theory under §§ 102 and 103 was inappropriately applied; (5) that which only the inventor taught was attributed to the prior art; (6) individual steps in prior art processes dealing with materials distinct from those with which the present inventions dealt were erroneously equated to steps in the claimed processes; (7) objective evidence of nonobviousness was disregarded; and (8) the function and application of § 112 were misconstrued.

Because it permeated so much of the district court's analysis, we note more fully its frequent restriction of its consideration to 10% per second rate of stretching, which it called the "thrust of the invention". That approach is repeated throughout Garlock's briefs, which refer repeatedly to the "thrust of the invention", to "the inventive concept", and to the claims "shorn of their extraneous limitations". That facile focusing on the "thrust", "concept", and "shorn" claims, resulted in treating the claims at many points as though they read differently from those actually allowed and in suit.

[1] It is true that Dr. Gore emphasized rapid stretching, for example, as well as the amount of stretch and other process limitations, during prosecution of the application for the '566 patent. Yet it is the claims that measure and define the invention. *Aro Manufacturing Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 339, 81 S.Ct. 599, 600, 5 L.Ed.2d 592 (1961); *Bowser, Inc. v. U.S.*, 388 F.2d 346, 349, 156 USPQ 406, 409 (Ct.Cl.1967).

[2, 3] Each claimed invention must be considered as a whole. 35 U.S.C. § 103; *Schenck, A.G. v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698, 700 (Fed.Cir.1983). In determining obviousness, there is "no legally recognizable or protected 'essential', 'gist', or 'heart' of the invention". *Aro*, 365 U.S. at 345, 81 S.Ct. at 604. A court's restriction of a claimed multi-step process to one step constitutes error, whether done at the behest of a patentee relying on that restriction to establish infringement by one who employs only that one step in a process otherwise distinct, or at the behest of an accused infringer relying on that restriction to establish invalidity by showing that one step in a prior art process otherwise distinct.

(1) *Invalidity*

(a) *'566 Patent*

(i) *§ 102(a) and The 401 Machine*

It is undisputed that the district court held only claim 1 of the '566 patent to have been anticipated under § 102(a) by operation of the 401 machine in the Gore shop before Dr. Gore's invention in late October 1969. It did so on the deposition testimony of two former Gore employees, documents, and drawings of the 401 machine.

[4] In August, 1969, Gore offered to sell to Export Tool Company (Export) tape "to be made" on the 401 machine. Tape made on the 401 machine was shipped to Export on October 24, 1969. The trial judge found the rolls on the 401 machine were, at least at some point in time before October 1969, spaced less than four feet apart and that the rate of stretch accomplished in operating that machine (admittedly operated in accord with the description of machine operation in the '915 patent) must have been greater than 10% per second. The district court credited testimony that Teflon 6–c, a highly crystalline form of Teflon, was used because it was the standard resin at the time, and that the tape was stretched at a temperature above 35°C. Thus it cannot be said that the record fails to support the district court's finding that the limitations of claim 1 were met by Gore's operation of the 401 machine before Dr. Gore's asserted "late October, 1969" date of invention. Though he was working with the operation of the 401 machine, Dr. Gore offered no proof that his invention date was before the date of shipment to Export.

[5] Gore, seeking a review here of the evidence, points to certain inadequacies as indicating a failure to meet the required clear and convincing standard under § 102(a). At the time of trial, the district court, bound by precedent then applicable, applied a preponderance of the evidence test. Gore asserts, erroneously, that the clearly erroneous standard does not therefore apply on this appeal. Gore does not, however, point to any basis on which the district court's findings must be held to have been clearly erroneous under the clear and convincing standard. We are not at liberty, of course, to substitute our own for the district court's findings underlying its conclusion that claim 1 is invalid.

[6] Gore's operation of the 401 machine must thus be viewed as a consistent, reproducible use of Dr. Gore's invention as set forth in claim 1, and it is therefore irrelevant that those using the invention may not have appreciated the results. *General Electric Co. v. Jewel Incandescent Lamp Co.*, 326 U.S. 242, 248, 66 S.Ct. 81, 83, 90 L.Ed. 43, 67 USPQ 155, 157–58 (1945). Were that alone enough to prevent anticipation, it would be possible to obtain a patent for an old and unchanged process. *Ansonia Brass & Copper Co. v. Electric Supply Co.*, 144 U.S. 11, 18, 12 S.Ct. 601, 604, 36 L.Ed. 327 (1892); *see, H.K. Regar & Sons, Inc. v.*

Scott & Williams, Inc., 63 F.2d 229, 231, 17 USPQ 81, 83 (2d Cir.1933).

[7] The nonsecret use of a claimed process in the usual course of producing articles for commercial purposes is a public use. *Electric Storage Battery Co. v. Shimadzu*, 307 U.S. 5, 20, 59 S.Ct. 675, 684, 83 L.Ed. 1071, 41 USPQ 155, 161 (1939), and there was no evidence that any different process was used to produce the articles shipped to Export.

Thus it cannot be said that the district court erred in determining that the invention set forth in claim 1 of '566 patent was known or used by others under § 102(a), as evidenced by Gore's operation of the 401 machine before Dr. Gore's asserted date of that invention.

In view of our affirmance of the judgment reached on claim 1 under 102(a), we need not discuss other asserted grounds of invalidity of claim 1. There was, however, no evidence whatever that the inventions set forth in other claims, of either the '566 or the '390 patent, were known or used by others as a result of Gore's operation of the 401 machine before late October, 1969.

(ii) *§ 102(b) and the Cropper Machine*

In 1966 John W. Cropper (Cropper) of New Zealand developed and constructed a machine for producing stretched and unstretched PTFE thread seal tape. In 1967, Cropper sent a letter to a company in Massachusetts, offering to sell his machine, describing its operation, and enclosing a photo. Nothing came of that letter. There is no evidence and no finding that the present inventions thereby became known or used in this country.

In 1968, Cropper sold his machine to Budd, which at some point thereafter used it to produce and sell PTFE threat seal tape. The sales agreement between Cropper and Budd provided:

> *ARTICLE "E"—PROTECTION OF TRADE SECRETS Etc.*
>
> *1. BUDD* agrees that while this agreement is in force it will not reproduce any copies of the said apparatus without the express written permission of Cropper nor will it divulge to any person or persons other than its own employees or employees of its affiliated corporations any of the said known-how or any details whatsoever relating to the apparatus.
>
> *2. BUDD* agrees to take all proper steps to ensure that its employees observe the terms of Article "E" 1 and further agrees that whenever it is proper to do so it will take legal action in a Court of competent jurisdiction to enforce any one or more of the legal or equitable remedies available to a trade secret plaintiff.

Budd told its employees the Cropper machine was confidential and required them to sign confidentiality agreements. Budd otherwise treated the Cropper machine like its other manufacturing equipment.

[8] A former Budd employee said Budd made no effort to keep the secret. That Budd did not keep the machine hidden from employees legally bound to keep their knowledge confidential does not evidence a failure to maintain the secret. Similarly, that du Pont employees were shown the machine to see if they could help increase its speed does not itself establish a breach of the secrecy agreement. There is no evidence of when that viewing occurred. There is no evidence that a viewer of the machine could thereby learn anything of which process, among all possible processes, the machine is being used to practice. As Cropper testified, looking at the machine in operation does not reveal whether it is stretching, and if so, at what speed. Nor does looking disclose whether the crystallinity and temperature elements of the invention set forth in the claims are involved. There is no evidence that Budd's secret use of the Cropper machine made knowledge of the claimed process accessible to the public.

The district court held all claims of the '566 patent invalid under 102(b), *supra*, note 3, because "the invention" was "in public use [and] on sale" by Budd more than one year before Gore's application for patent. Beyond a failure to consider each of the claims independently, 35 U.S.C. § 282; *Altoona Publix Theatres, Inc. v. American*

Tri-Ergon Corp., 294 U.S. 477, 487, 55 S.Ct. 455, 459, 79 L.Ed. 1005 (1935), and a failure of proof that the claimed inventions as a whole were practiced by Budd before the critical May 21, 1969 date, it was error to hold that Budd's activity with the Cropper machine, as above indicated, was a "public" use of the processes claimed in the '566 patent, that activity having been secret, not public.

Assuming, arguendo, that Budd sold tape produced on the Cropper machine before October 1969, and that that tape was made by a process set forth in a claim of the '566 patent, the issue under § 102(b) is whether that sale would defeat Dr. Gore's right to a patent on the process inventions set forth in the claims.

[9] If Budd offered and sold anything, it was only tape, not whatever process was used in producing it. Neither party contends, and there was no evidence, that the public could learn the claimed process by examining the tape. If Budd and Cropper commercialized the tape, that could result in a forfeiture of a patent granted them for their process on an application filed by them more than a year later. *D.L. Auld Co. v. Chroma Graphics Corp.*, 714 F.2d 1144, at 1147–48 (Fed.Cir.1983); *See Metallizing Engineering Co. v. Kenyon Bearing & Auto Parts Co.*, 153 F.2d 516, 68 USPQ 54 (2d Cir.1946). There is no reason or statutory basis, however, on which Budd's and Cropper's secret commercialization of a process, if established, could be held a bar to the grant of a patent to Gore on that process.

[10] Early public disclosure is a linchpin of the patent system. As between a prior inventor who benefits from a process by selling its product but suppresses, conceals, or otherwise keeps the process from the public, and a later inventor who promptly files a patent application from which the public will gain a disclosure of the process, the law favors the latter. *See Horwath v. Lee*, 564 F.2d 948, 195 USPQ 701 (CCPA 1977). The district court therefore erred as a matter of law in applying the statute and in its determination that Budd's secret use of the Cropper machine and sale of tape rendered all process claims of the '566 patent invalid under § 102(b).

(iii) *§ 103*

In considering claims 1, 3, 17, and 19 of the '566 patent, the district court recognized that analysis of the obviousness issue under § 103 requires determination of the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966).

[11] In its consideration of the prior art, however, the district court erred in not taking into account the import of the markedly different behavior of PTFE from that of conventional thermoplastic polymers clearly established and undisputed on the record, and in thus disregarding the unpredictability and unique nature of the unsintered PTFE to which the claimed inventions relate, *In re Whiton*, 420 F.2d 1082, 164 USPQ 455 (CCPA 1970); in considering claims in less than their entireties, *Schenck, supra;* and in considering the references in less than their entireties, i.e., in disregarding disclosures in the references that diverge from and teach away from the invention at hand. *In re Kuderna*, 426 F.2d 385, 165 USPQ 575 (CCPA 1970).

Invalidity of claim 1 under § 102(a) having been determined, it is unnecessary to discuss in detail the applicability of § 103 to that claim. If claim 1 had not been held anticipated under § 102(a) in light of operation of the 401 machine, it is clear from the discussion here that claim 1 could not properly have been held invalid under § 103.

Claim 3 depends from and thus incorporates claim 1 but specifies a rate of stretch of 100% per second. Claim 17 also depends from claim 1 and specifies an amount of stretch of about twice the original length. Claim 19 depends from claim 17 but specifies an amount of stretch of about five times the original length.

U.S. patent 2,983,961 to Titterton, Volume 13 of the *Encyclopedia of Polymer*

Science and Technology (1970), the Sumitomo patent, and witnesses for both parties, establish that teachings related to conventional thermoplastic polymers are inapplicable to PTFE.

Articles by Dogliotti and Yelland, *Effect of Strain Rate on the Viscoelastic Properties of High Polymeric Fibrous Materials*, 4 High Speed Testing 211 (1964) and Robinson and Graham, *Methods of Characterization of Polymeric Materials by High Speed Testing Techniques*, 5 High Speed Testing 261 (1965), teach that conventional plastics and sintered PTFE can be stretched further if stretched slowly. Dr. Gore demonstrated at trial and at oral argument before us that an attempt to stretch highly crystalline, unsintered PTFE slowly results in breakage, and that rapid stretching produces a greatly lengthened rod of soft, flexible material.

The '566 patent contains an example of stretching an article to 16 times its length. Smith and the '915 patent teach that PTFE could not be stretched beyond four times its length without heating it to above its crystalline melt temperature, a step avoided by Dr. Gore and as set forth in the claims.

Sumitomo teaches that there is a length limit to stretching unsintered PTFE, and does not suggest what that limit might be. Markwood, U.S. patent 3,208,100 to Nash (Nash), and U.S. patent 2,823,421 to Scarlett (Scarlett) teach that *non-PTFE* thermoplastics can be stretched rapidly and to extended lengths, and *also* teach reduction, elimination, or avoidance of crystallinity before stretching.

[12] The disclosure in the Smith and '915 patents that a PTFE article may be stretched to as much as four times its length encompasses the step of stretching to twice its length set forth in claim 17 and establishes that such step would have been obvious.

Claims 3 and 19 must be considered individually and separately. 35 U.S.C. § 282. Nowhere, in any of the references, is it taught or suggested that highly crystalline, unsintered PTFE could be stretched at a rate of about 100% per second as required by asserted claim 3. Nor is it anywhere suggested that by rapid stretching a PTFE article be stretched to more than five times its original length as required by asserted claim 19. On the contrary, the art as a whole teaches the other way.

In concluding that obviousness was established by the teachings in various pairs of references, the district court lost sight of the principle that there must have been something present in those teachings to suggest to one skilled in the art that the claimed invention before the court would have been obvious. *In re Bergel*, 292 F.2d 955, 956–57, 130 USPQ 206, 208 (CCPA 1961); *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 244 (CCPA 1969).

The court's pairing of Sumitomo and Markwood disregarded, as above indicated, the undisputed evidence that the unsintered PTFE of Sumitomo does not respond to the conventional plastics processing of Markwood and the art recognition of that fact. *Whiton, supra*, 420 F.2d at 1085, 164 USPQ at 457.

In evaluating claim 19, for example, the pairing disregarded Sumitomo's limited length of stretch teaching. In evaluating claim 3, the court recognized that Sumitomo made no mention of rate of stretch. Looking to Markwood to supply that teaching disregarded not only the conventional plastics-unsintered PTFE distinction but also the clear divergence of Markwood's teaching that crystallinity must be reduced or avoided from the presence of "highly crystalline" in all claims of the '566 patent.

Similarly, and for many of the same reasons, the pairing of Markwood's and Smith's teachings was an inappropriate basis for concluding that the processes set forth in claims 3 and 19 would have been obvious. As above indicated, Markwood's rapid stretching of conventional plastic polypropylene with reduced crystallinity would not suggest rapid stretching of highly crystalline PTFE, in light of teachings in the art that PTFE should be stretched slowly. The Smith patent is owned by du Pont, where Dr. Gore's process invention was considered

to have produced a "remarkable new material". That circumstance is not surprising, for Smith, though dealing with PTFE, says not a word about any rate of stretch.

Lastly, the pairing of Sumitomo and the '915 patent suffers from the same shortcomings. The pairing resulted from a hypothetical set forth in Garlock's post trial brief, and was based on no testimony or other evidence in the record. In respect of claim 8, neither reference mentions rate of stretch or suggests its importance. In respect of claim 19 both references point away from the claimed invention in their limited length-of-stretch teachings. The '915 patent states: "the 65 percent expanded material could be expanded a second time for an additional 65 percent expansion or a total length increase ratio of 1:2.72 [less than three times the original length]. However, great care was necessary to obtain a uniformly expanded material at these very great expansion ratios." Thus the '915 patent suggests that the amount of stretch of 500% set forth in claim 19 (more than five times the original length) is not possible.

As indicated, Sumitomo and Smith are totally silent respecting the rate of stretch, and there is simply no teaching in the art that would suggest to one of ordinary skill that Markwood's fast stretching of other thermoplastics could or should be employed in the process of treating PTFE taught by either Sumitomo or Smith. Indeed, Smith not only says nothing about rate of stretch, its preferred teaching is away from other elements of the inventions set forth in claims 8 and 19 Smith discloses that stretching should be done after the PTFE is heated above its crystalline melting point and with decreased crystallinity. Smith teaches:

> Below about 300°C it is *not possible* to draw more than about 4× [times] and while such draw ratios can be attained around 300°C and below the polymer's crystalline melting point with resultant orientation and improved properties it is preferred to use temperatures at or above the polymer's crystalline melting point. (Emphasis added).

Nash teaches that the film should be plasticized, i.e., made more viscous, before stretching. Contrary to that teaching, Dr. Gore did not reduce crystallinity before increasing the rate of stretch, but maintained the unsintered PTFE "highly crystalline" while stretching at a 100% per second rate and to more than five times, as set forth respectively in claims 8 and 19.

On the entire record and in view of all the references, each in its entirety, it is clear that a person of ordinary skill confronted with a PTFE tape breakage problem would have either slowed the rate of stretching or increased the temperature to decrease the crystallinity. Dr. Gore did neither. He proceeded contrary to the accepted wisdom of the prior art by dramatically increasing the rate and length of stretch *and* retaining crystallinity. That fact is strong evidence of nonobviousness. *United States v. Adams*, 383 U.S. 39, 86 S.Ct. 708, 15 L.Ed.2d 572 (1966).

Having learned the details of Dr. Gore's invention, the district court found it within the skill of the art to stretch other material rapidly (Markwood); to stretch PTFE to increase porosity (Sumitomo); and to stretch at high temperatures (Smith). The result is that the claims were used as a frame, and individual, naked parts of separate prior art references were employed as a mosaic to recreate a facsimile of the claimed invention. At no point did the district court, nor does Garlock, explain why that mosaic would have been obvious to one skilled in the art in 1969, or what there was in the prior art that would have caused those skilled in the art to disregard the teachings there found against making just such a mosaic. On the contrary, the references and the uncontested testimony, as above indicated, established that PTFE is *sui generis*. It is not surprising, therefore, that, unlike the situation in *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed.Cir.1983), there was no testimony and no finding that one skilled in the art would transfer conventional thermoplastic

processes to those for unsintered PTFE, or would have been able to predict what would happen if they did.

To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

It is difficult but necessary that the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art. Had that been here done the inventions set forth in the claims 3 and 19 of the '566 patent could only have been held non-obvious to those skilled in the art at the time those claimed inventions were made.

[13, 14] Error in visualizing the burden of proof on obviousness may have contributed to the court's application here of the prior art. Adopting the phrase from earlier precedents, the court said "the presumption [of validity] is weakened greatly where the Patent Office has failed to consider pertinent prior art". That is not the law of established precedent in this court. *SSIH Equipment S.A. v. ITC*, 718 F.2d 365, 218 USPQ 678, 687 (Fed.Cir.1983); *Solder Removal Co. v. ITC*, 582 F.2d 628, 633, 199 USPQ 129, 133, n. 9 (CCPA 1978). The presumption has no separate evidentiary value. It cautions the decisionmaker against a rush to conclude invalidity. Submission of additional art that is merely "pertinent" does not dispel that caution. It is difficult to imagine a patent law suit in which an accused infringer is unable to add some new "pertinent" art. The inescapable burden of persuasion on one who would prove invalidity, however, remains throughout the trial. 35 U.S.C. § 282.

The burden of proving invalidity may of course be facilitated by prior art that is *more pertinent* than that considered by the PTO. That did not happen here. In the present case, Sumitomo, Smith, and the '915 patent were among references considered by the PTO. Other references referred to as not considered were merely cumulative, disclosing nothing not disclosed in references that were considered by the PTO. The Canadian counterpart of Nash was considered by the PTO. The relevant disclosures of Markwood appear in Sandiford patent 3,544,671 and Paratheon patent 3,687,-906, both considered by the PTO. The Russian Author's Certificate 240,997, assuming its status as prior art and whatever the material with which it dealt, contributed nothing beyond the teachings of the '915 patent considered by the PTO.

[15] As discussed more fully below, the district court erred in specifically declining to consider the objective evidence of nonobviousness. *In re Sernaker*, 702 F.2d 989, 996, 217 USPQ 1, 7 (Fed.Cir.1983). That evidence can often serve as insurance against the insidious attraction of the siren hindsight when confronted with a difficult task of evaluating the prior art. Though the prior art evidence here pointed more in the direction of nonobviousness than obviousness, the objective evidence may tend, as it did in *Sernaker, supra*, to reassure the decisionmaker.

[16] In sum, the district court erred as a matter of law on this record in concluding that Garlock had met its burden of proving that the inventions of claims 3 and 19 of the '566 patent would have been obvious.

(b) *'390 patent*

(i) *§ 102*

The district court found product claims 1, 9, 12, 14, 18 and 43 inherently anticipated because it found that the microstructure of nodes interconnected by fibrils is an inherent characteristic of paste-extruded PTFE products resulting from the process disclosed in Smith. The court found the first four of those claims and claim 43, plus claims 35, 36, 67 and 77 inherently anticipa-

ted because high strength PTFE products are inherent in the examples of Sumitomo.

The teachings of Smith include neither a disclosure nor a suggestion of "porous" products having a "microstructure characterized by nodes interconnected by fibrils" as required by the claims found to have been anticipated by Smith.

The teachings of Sumitomo do not include a disclosure of products having "a matrix tensile strength ... above about 7,300 psi" as required by the claims found to have been anticipated by Sumitomo.

[17] Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *Soundscriber Corp. v. U.S.*, 360 F.2d 954, 960, 148 USPQ 298, 301, *adopted*, 149 USPQ 640 (Ct.Cl.1966). Neither Smith nor Sumitomo disclose an invention set forth in any claim of the '890 patent.

The incongruity in findings that the different processes of Smith and Sumitomo each inherently produced identical products is striking.

Garlock attempted with expert testimony to overcome the prior art shortcomings as proof of anticipation. Gore rebutted with its own expert testimony. It is unnecessary, however, to resolve apparent conflicts in the divergent testimony, much if not all of which took the form of pure unsupported assertion. Nc inter partes tests in which the Smith and Sumitomo processes were conducted are of record. No products of those processes were placed in evidence, and there was, of course, no analysis of any such evidentiary products.

Nor is it necessary to evaluate the inappropriate disparagement in Garlock's brief of Dr. Sperati as a "friend" of Gore.

[18] Given the unique nature of unsintered PTFE, we are not persuaded that the "effect" of the processes disclosed in Smith and Sumitomo, an "effect" undisclosed in those patents, would be always to inherently produce or be seen always to produce products meeting all of the claim limitations. Anticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting the characteristics of products that might result from the practice of processes disclosed in references. *In re Felton*, 484 F.2d 495, 500, 179 USPQ 295, 298 (CCPA 1973). It is clear that the teachings of neither Smith nor Sumitomo place the products claimed in the '390 patent in possession of the public.

[19] The teachings of Smith and Sumitomo are so unacceptably vague concerning characteristics of products produced by their respective processes as not to support an anticipation rejection. That fact is confirmed by the PTO's having fully considered those references and by its having issued the '390 patent over them.

[20, 21] Garlock's assertion that it employs a process covered by the Smith patent, if true, is irrelevant. The '390 patent was allowed over Smith as a reference. Assuming Smith a dominating patent, the rule of law is clear that an accused infringer's employment of the process of a dominating patent does not render that employment an anticipation of an invention described and claimed in an improvement patent. As indicated, there is no present record basis for finding that the Smith process in itself necessarily and inherently results in the products, each considered in its entirety, in the claims of the '890 patent. The testimony of Garlock's expert about ex parte tests, the records of which he destroyed before trial, cannot serve as such a basis. The effusive praise of Dr. Gore's claimed products by the owner of the Smith patented process would appear, on the contrary, to confirm the action of the PTO in issuing the '390 patent.

[22] Garlock has not met its burden of showing that claims 1, 9, 12, 14, 18, and 43 are anticipated by Smith or that claims 1, 9, 12, 14, 35, 36, 43, 67, and 77 are anticipated by Sumitomo.

(ii) *§ 103*

[23, 24] The scope and content of the prior art and level of ordinary skill, discussed above in relation to the '566 patent,

would be the same for the '390 patent. The district court did not, however, nor does Garlock, apply the *Graham* criteria, *supra*, to the '390 claims, apparently assuming that the claimed products, having been found inherent in the processes of Sumitomo and Smith, would have been obvious in view of those references. If so, that was error. Inherency and obviousness are distinct concepts. *In re Spormann*, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966).

In discussing inherency the district court did recognize differences between Smith's disclosure and the inventions set forth in claims 1, 9, 12, 14, 18, and 43, i.e., the absence from Smith of a description of the products of Smith's process as porous and the absence from Smith of a disclosure that those products have a microstructure characterized by nodes interconnected by fibrils.

Similarly, a difference between Sumitomo's disclosure and the inventions set forth in claims 1, 9, 12, 14, 35, 36, 43, 67, and 77 was recognized in the absence from Sumitomo of a quantification of the matrix tensile strengths of the products of Sumitomo's process. The district court also discussed differences between the dependent claims and the prior art. Because we conclude that the independent claims of the '390 patent are patentable over the art of record, we need not discuss the dependent claims.

[25] Having determined that the invention would have been obvious in view of the process of either Smith or Sumitomo, the district court did not discuss the strong showing of objective evidence of nonobviousness here present, saying with respect to one part of such evidence, "no amount of commercial success can save it." That approach was error. All evidence bearing on the issue of obviousness, as with any other issue raised in the conduct of the judicial process, must be considered and evaluated *before* the required legal conclusion is reached. *Stratoflex*, *supra*, 713 F.2d 1530, 218 USPQ at 879.

[26] The objective evidence of nonobviousness, i.e., the "indicia" of *Graham*, *supra*, may in a given case be entitled to more weight or less, depending on its nature and its relationship to the merits of the invention. It may be the most pertinent, probative, and revealing evidence available to aid in reaching a conclusion on the obvious/nonobvious issue. It should when present always be considered as an integral part of the analysis.

Gore's fabric laminates, for example, as set forth in claims 36 and 77, satisfied a long felt need for a material having the contradictory properties of being simultaneously breathable (allowing water vapor or perspiration to pass) and waterproof. The record establishes that such a material had long been sought by makers of rainwear and outerwear, and by the U.S. Army as well. That Gore's fabric laminates filled that need is attested by the rise in their annual dollar sales from zero to seven million in the first five years of their availability.

Gore's PTFE tubes for replacement of human arteries and veins, also satisfied a long felt need. The uncontradicted evidence establishes that Gore's PTFE tubes hold blood without leaking, need not be pre-clotted with the patient's blood, are chemically inert, and, being breathable, are less likely to cause an air embolism. The value and uniqueness of those four properties make Gore's PTFE tubes, as described in unchallenged testimony, "the most important synthetic material presently existing" in vascular surgery, and, along with other evidence in the record, reflect the intended working of the patent system.

As discussed above, current annual sales of over sixty million dollars are attributable to the merits of the products claimed in the '390 patent. Considering the long felt need for those products and the obvious commercial advantage to be gained by meeting that need, it is reasonable to conclude that the claimed products of the '390 patent would not have been obvious to persons of ordinary skill in the art at the time the claimed inventions were made.

As above indicated, the praise which greeted the products claimed in the '390 patent from PTFE suppliers, including the

owner of the Smith patent, is further objective evidence of nonobviousness.

[27] Garlock's appeal argument that the '390 claims are invalid because the recited minimum matrix tensile strengths are not "critical" is without merit. A claim to a new product is not legally required to include critical limitations. *In re Miller*, 441 F.2d 689, 696, 169 USPQ 597, 602 (CCPA 1971). The '390 claims are not drawn to optimization of ingredients or ranges within broad prior art teachings, but to new porous PTFE products of particular characteristics.

[28] In sum, and in view of the difficulty of working with unsintered PTFE and its unpredictable response to various processing techniques, the vagueness of Smith and Sumitomo concerning the products produced by those processes, the filling of at least two long felt needs and the commercial success described above, we conclude that the inventions set forth in claims 1, 9, 12, 14, 18, 35, 36, 43, 67, and 77 of the '390 patent would not have been obvious to those skilled in the art at the time those inventions were made.

(c) *§ 112 and the '566 and '390 patents*

The patents in suit resulted from a single application and thus have substantially identical specifications. The holding of invalidity on the basis of § 112 is common to both patents.

The district court found that the patents did not disclose sufficient information to enable a person of ordinary skill in the art to make and use the invention, as required by § 112, first paragraph, and that certain claim language was indefinite, presumably in light of § 112, second paragraph, because: (1) there was no definition in the specification of "stretch rate", different formulae for computing stretch rate having been developed and presented at trial; (2) there was no way taught in the specification to calculate the minimum rate of stretch above 35°C; (3) the phrase "matrix tensile strength" is indefinite; and (4) the phrase "specific gravity of the solid polymer" is indefinite.

[29, 30] The findings rest on a misinterpretation of § 112, its function and purpose. The district court considered whether certain terms would have been enabling to the public and looked to formula developments and publications occurring well after Dr. Gore's filing date in reaching its conclusions under § 112. Patents, however, are written to enable those skilled in the art to practice the invention, not the public, *In re Storrs*, 245 F.2d 474, 478, 114 USPQ 293, 296–97 (CCPA 1957), and § 112 speaks as of the application filing date, not as of the time of trial. *In re Mott*, 539 F.2d 1291, 1296, 190 USPQ 536, 541 (CCPA 1976). There was no evidence and no finding that those skilled in the art would have found the specification non-enabling or the claim language indefinite on May 21, 1970, when the application which resulted in issuance of Dr. Gore's patents was filed. Indeed, the expert quoted by the district court and whose testimony was primarily relied upon respecting formulae, was still in school at that time.

[31] There is uncontradicted evidence in the record that at the time the application was filed "stretch rate" meant to those skilled in the art the percent of stretch divided by the time of stretching, and that the latter was measurable, for example, with a stopwatch. Concern for the absence from the specification of a formula for calculating stretch rate is therefore misplaced, and the post-filing date development of varying formulae, including Dr. Gore's later addition of a formula in his corresponding Japanese patent, is irrelevant.

[32] Section 112 requires that the inventor set forth the best mode of practicing the invention known to him at the time the application was filed. Calculating stretch rate at that time was accomplished by actually measuring the time required to stretch the PTFE material. That was the only mode then used by the inventor, and it worked. The record establishes that calculation by that mode would have been em-

ployed by those of ordinary skill in the art at the time the application was filed. As indicated, Dr. Gore's disclosure must be examined for § 112 compliance in light of knowledge extant in the art on his application filing date.

[33] The district court, though discussing enablement, spoke also of indefiniteness of "stretch rate", a matter having to do with § 112, second paragraph, and relevant in assessment of infringement. The use of "stretching ... at a rate exceeding about 10% per second" in the claims is not indefinite. Infringement is clearly assessable through use of a stopwatch. No witness said that could not be done. As above indicated, subsequently developed and therefore irrelevant formulae cannot be used to render non-enabling or indefinite that which was enabling and definite at the time the application was filed.

[34, 35] Similarly, absence from the specification of a method for calculating the minimum rate of stretch above 35°C does not render the specification non-enabling. The specification discloses that "[t]he lower limit of expansion rates interact with temperature in a roughly logarithmic fashion, being much higher at higher temperatures." Calculation of minimum stretch rate above 35°C is nowhere in the claims, and it is the *claimed* invention for which enablement is required. The claims require stretching at a rate greater than 10% per second at temperatures between 35°C and the crystalline melt point of unsintered PTFE. That the minimum rate of stretch may increase with temperature does not render non-enabling Dr. Gore's specification, particularly in the absence of convincing evidence that those skilled in the art would have found it non-enabling at the time the application was filed.

[36–38] The district court invalidated both patents for indefiniteness because of its view that some "trial and error" would be needed to determine the "lower limits" of stretch rate above 10% per second at various temperatures above 35°C. That was error. Assuming some experimentation were needed, a patent is not invalid because of a need for experimentation. *Minerals Separation, Ltd. v. Hyde*, 242 U.S. 261, 270–71, 37 S.Ct. 82, 86, 61 L.Ed. 286 (1916). A patent is invalid only when those skilled in the art are required to engage in *undue* experimentation to practice the invention. *In re Angstadt*, 537 F.2d 498, 503–04, 190 USPQ 214, 218 (CCPA 1976). There was no evidence and the court made no finding that undue experimentation was required.

[39] Moreover, the finding here rested on confusion of the role of the specification with that of the claims. The court found that the specification's failure to state the lower limit of stretch rate (albeit above 10% per second) at each degree of temperature above 35°C (a requirement for at least hundreds of entries in the specification) did not "distinguish processes performed above the 'lower limit' from those performed below the 'lower limit' ". The claims of the '390 patent say nothing of processes and lower limits. Distinguishing what infringes from what doesn't is the role of the claims, not of the specification. It is clear that the specification is enabling, *In re Storrs, supra*, and that the claims of both patents are precise within the requirements of the law. *In re Moore*, 439 F.2d 1232, 169 USPQ 236 (CCPA 1971).

[40, 41] The finding that "matrix tensile strength" is indefinite, like the other findings under § 112, appears to rest on a confusion concerning the roles of the claims and the specification. While finding "matrix tensile strength" in the claims indefinite, the district court at the same time recognized that the specification itself disclosed how to compute matrix tensile strength, in stating "to compute matrix tensile strength of a porous specimen, one divides the maximum force required to break the sample by the cross sectional area of the porous sample, and then multiplies this quantity by the ratio of the specific gravity of the solid polymer divided by the specific gravity of the porous specimen." Further, the specification provided the actual matrix tensile strength in several ex-

amples. It is well settled that a patent applicant may be his own lexicographer. In light of the disclosure of its calculation in the specification, we cannot agree that "matrix tensile strength" is either indefinite or non-enabling.

[42] Nor does absence from the specification of a definition for "specific gravity of the solid polymer", a part of the computation of matrix tensile strength, render that computation indefinite. It is undisputed that in the many examples in the application the specific gravity values used for unsintered and sintered PTFE were 2.3 and 2.2, respectively. There was no testimony that those values were not known to persons of ordinary skill in the art or could not be calculated or measured. There is simply no support for the conclusion that "specific gravity of the solid polymer" is indefinite or that absence of its definition renders the specification non-enabling. *See In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

We conclude that Garlock has failed to prove that at the time the application was filed, the specification was not enabling or that the claims were indefinite within the meaning of § 112.

(2) *Fraud*

[43] Fraud must be shown by clear and convincing evidence. *Norton v. Curtiss*, 433 F.2d 779, 797, 167 USPQ 532, 546–47 (CCPA 1970).

> The state of mind of the one making the representations is probably the most important of the elements to be considered in determining the existence of "fraud." ... Good faith and subjective intent, while they are to be considered, should not *necessarily* be made controlling. Under ordinary circumstances, the *fact* of misrepresentation coupled with proof that the party making it had knowledge of its falsity is enough to warrant drawing the inference that there was a fraudulent intent. Where public policy demands a complete and accurate disclosure it may suffice to show nothing more than that the misrepresentations were made in an atmosphere of gross negligence as to their truth. [emphasis in original].

Norton, 433 F.2d at 795–96, 167 USPQ at 545; *see*, Miller, *Fraud on the PTO*, 58 JPOS 271 (1976).

[44] Garlock alleges fraud in Gore's representations that stretching PTFE tape at a rate greater than 10% per second was novel and that it produces a physical phenomenon. The district court found the evidence insufficient to establish that Gore had a specific intent to defraud the PTO. No basis exists for our overturning that finding. Accordingly, we agree with the district court that Garlock has failed to sustain its heavy burden of proving, by clear and convincing evidence, sufficient facts from which fraudulent intent can be inferred.

Garlock points to a September 4, 1975 Gore affidavit filed in the PTO that stated:

> 2. Prior to my invention disclosed in the captioned patent application, during production of expanded PTFE products by W.L. Gore & Associates, Inc., the rate of stretching was neither measured nor controlled and to my knowledge did *not* involve stretching of unsintered PTFE at a rate exceeding about 10% per second. (emphasis in original)

No finding of the district court and no evidence of record establishes that that statement was made in reckless disregard of facts from which an intent to defraud may be inferred.

[45] The district court's finding in 1982 that the 401 machine inherently stretched tape at some time in 1969 at a rate more than 10% per second, does not establish that Dr. Gore was aware of that fact in 1975, nor does it make untrue his statement that to his knowledge that had not been the rate of stretch employed. Nor does the district court's finding conflict with Dr. Gore's statement that the rate of stretching was neither measured nor controlled in the Gore shop before his invention of the claimed process as a whole.

[46] Nor does the evidence of isolated statements support Garlock's contention

that Dr. Gore attempted to convince the PTO that a physical phenomenon always existed in which stretching at a rate greater than 10% per second always produced a matrix tensile strength greater than 7300 psi. On the contrary, Dr. Gore set forth in his specification examples indicating that some samples broke, ruptured, or disintegrated.

(3) *Attorney's Fees*

[47] The district court did not abuse its discretion in denying Garlock its request for attorney fees.

Infringement

[48] Where, as here, an appellate court reverses a holding of invalidity, and remand is ordered for trial of the factual issue of infringement, an inefficient use of judicial resources results if the second judgment is appealed. The better practice would therefore be for the district court to decide both the validity and infringement issues when both are contested at the trial, enabling the conduct of a single appeal and disposition of the entire case in a single appellate opinion.

Resolution of the infringement issue at trial may also overlap with resolution of the validity issue, where, for example, the claimed invention was or was not copied by the validity challenger, or the challenger substituted the claimed invention for freely available prior art processes or products, *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45, 56, 43 S.Ct. 322, 325, 67 L.Ed. 523 (1923), or an assertion of nonenablement may conflict with the ease with which the accused infringer may be shown to have practiced the invention as taught in the patent. *Eibel, supra*, 261 U.S. at 65–66, 43 S.Ct. at 329.

The district court having declined to decide the infringement issue, Gore suggests that the record here is sufficient to warrant our deciding it now. With reluctance in view of the length and bitter nature of the present litigation, we decline the suggestion. In so doing, we imply nothing of our view on the issue. Nor do we intend any implication that the district court could not itself determine the infringement issue on the present record. Infringement of particular claims of two patents was asserted. None of those claims has been finally held invalid. Assuming their continued assertion, infringement must be decided with respect to each asserted claim as a separate entity. *Altoona, supra*, 294 U.S. at 487, 55 S.Ct. at 459. Those factual determinations should be made in the first instance by the district court.

Decision

The holdings of invalidity of claim 1 of the '566 patent under § 102(a) and of claim 17 of the '566 patent under § 103, the determination that Gore did not commit fraud on the PTO, and the denial of attorney fees, are affirmed; the holdings that all claims of the '566 patent are invalid under § 102(b), that claims 3 and 19 of the '566 patent are invalid under § 103, and that all claims of the '566 patent are invalid under § 112, are reversed. The holdings that claims 1, 9, 12, 14, 18, 35, 36, 43, 67, and 77 of the '390 patent are invalid under §§ 102 and 103, and that all claims of the '390 patent are invalid under § 112, are reversed. The case is remanded for determination of the infringement issue.

AFFIRMED IN PART, REVERSED IN PART, AND REMANDED.

Appendix

Claims of the '566 patent discussed at trial:

1. A process for the production of a porous article of manufacture of a polymer of tetrafluoroethylene which process comprises expanding a shaped article consisting essentially of highly crystalline poly (tetrafluoroethylene) made by a paste-forming extrusion technique, after removal of lubricant, by stretching said unsintered shaped article at a rate exceeding about 10% per second and maintaining said shaped article at a temperature between about 35°C. and the crystalline melt point of said tetrafluoroethylene polymer during said stretching.

Appendix—Continued

3. The process of claim 1 in which the rate of stretch is about 100% per second.

17. The process of claim 1 in which the shaped article is expanded such that its final length in the direction of expansion is greater than about twice the original length.

19. The process of claim 17 in which said final length is greater than about five times the original length.

Claims of the '390 patent discussed at trial:

1. A porous material consisting essentially of highly crystalline polytetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above about 73,00 psi.

9. A porous material consisting essentially of polytetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above 9290 psi, which material has been heated to a temperature above the crystalline melt point of said polymer and has a crystallinity below about 95%.

12. A porous material in accordance with claim 9 which is in the form of a shaped article.

14. A product in accordance with claim 12 which is in the form of a film.

18. A product in accordance with claim 12 which is in the form of continuous filaments.

35. A laminated structure comprising (a) a first shaped article formed of a porous material made of a tetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above about 7,300 psi, and (b) a second shaped article bonded to said first shaped article.

36. The structure of claim 35 in which said first shaped article is formed of a porous material which has a matrix tensile strength in at least one direction of at least 9290 psi, and has a crystallinity below about 95%.

43. A porous material made of a tetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils, which material (a) has a matrix tensile strength in at least one direction above about 9290 psi, (b) has been heated to a temperature above 327°C. and has a crystallinity below about 95%, and (c) has a dielectric constant of 1.2–1.8.

67. An impregnated structure comprising

(a) a shaped article formed of a porous material made of a tetrafluoroethylene polymer which material has a microstructure characterized by nodes interconnected by fibrils and a matrix tensile strength in at least one direction above about 9290 psi, and

(b) a polymer impregnated within the pores of the said shaped article.

77. The structure of claim 35 in which the first shaped article is a sheet having pores that will pass a gas but will not pass liquid water.

DAVIS, Circuit Judge, concurring in the result in part and dissenting in part.

I concur in the result on (1) the validity of the '390 patent under §§ 102–103; (2) the validity of the '390 patent under § 112; (3) the invalidity of claims 1 and 17 of the '566 patent; (4) lack of fraud on the Patent and Trademark Office; and (5) denial of attorney's fees. I disagree and dissent as to the validity of claims 3 and 19 of the '566 patent.

1. The process invention embodied in claim 1 of the '566 patent was known, through use of the 401 machine in the Gore shop, well before the "invention date" (claimed by Robert Gore, the inventor) of October 1969.[1] As such, the claimed invention was invalid on at least three grounds: (i) it was anticipated and therefore would

1. The 401 machine was used under the prior '915 patent (issued to Wilbert Gore) which contains no reference to the significance of the rate of stretch.

have been obvious (under 35 U.S.C. § 103) at the time of the claimed invention date; (ii) the invention was "in public use" by the Gore shop (under 35 U.S.C. § 102(b)) more than one year prior to the patent application (*i.e.*, prior to May 21, 1969); and (iii) the invention (made by Robert Gore) was known to and used "by others in this country" (35 U.S.C. § 102(a)) before the claimed invention date of October 1969, *i.e.* the invention was used by Wilbert Gore and others in the Gore shop before the October date.[2]

The critically important aspect of the invention of the '566 patent is the stretching of PTFE at a rate above 10% per second.[3] Robert Gore testified that he conceived this invention no earlier than October 1969 (and we have the right to take him at his word),[4] but the facts found by the District Court plainly show that the Gore shop was in fact practicing that invention considerably earlier.

The District Court found that in the 401 machine the distance between the stretch rollers controls the rate of stretch; a shorter distance results in a higher rate of stretch; for the process described in the '915 patent to be practiced with a rate of stretch *below* 10% per second, the distance between the stretch rollers would have to be greater than five feet; if the distance is less than four feet, the rate of stretch is greater than 10% per second; the machine drawings used to construct the 401 machine indicate that the distance between the stretch rollers was eight *inches;* a Gore employee testified that "I am reasonably sure that no effective [stretch] rolls in question would have been more than three feet simply because of the nature and size of the equipment" and that he did not remember any stretching more than three feet; another Gore employee testified that the distance between the rollers was "a maximum of 18 *inches*" (emphasis added); a document prepared by the same employee (an engineer) on June 10, 1969 reports that the stretch span was 8 *inches;* the 401 machine was the only stretching machine used by the Gore company; and the 401 machine was never substantially changed before October 1969. All this adds up to the fact that the 401 machine was at all relevant times operated with a stretch of less than four feet.[5] There is no question that the machine was so operated before October 1969 (the District Court found that sales of tape made by the 401 machine were proposed in August 1969).

I can accept Robert Gore's affidavit (to the PTO) that there was no stretching in the Gore shop at a rate exceeding about 10% per second prior to "*my* invention disclosed in the captioned patent application" (emphasis added)[6] only because that declaration was expressly qualified by the phrase "to *my* knowledge" (emphasis added). The District Court specifically found no specific intent by Robert Gore to defraud and, on this record, we cannot properly overturn that finding. But the absence of personal intent to defraud does not mean or say that, whether Robert Gore realized it or not, the 401 machine was not actually operating, well before October 1969, to stretch unsin-

2. Aside from the bases I discuss, I do not reach the other grounds asserted for invalidity of the '566 patent.

3. Before the PTO Robert Gore concededly referred to this as "critical" to his invention or as *his* "invention."

4. The District Court found that October 1969 was the earliest date Robert Gore asserts for his conception of the invention in the '566 patent.

5. The Gores (Robert and Wilbert) testified at trial that the distance was five feet but there is no indication that the trial court (which did not cite this testimony but did cite the opposing evidence) credited the Gores' testimony.

6. The factor of the rate of stretching was of direct interest to the examiner during the prosecution of the '566 patent. In response to the examiner's express request for a declaration that the Gore firm's production of stretched PTFE tape, prior to Robert Gore's invention asserted here, did not involve stretching of unsintered PTFE at a rate exceeding about 10% per second, Robert Gore filed an affidavit in the PTO specifically stating that "*to my knowledge*" (emphasis added) the 401 machine did *not* involve stretching at a rate exceeding about 10% per second.

tered PTFE at a rate exceeding about 10% per second. *Cf. O'Brien v. Westinghouse Electric Corp.*, 293 F.2d 1, 10 (3rd Cir.1961). It seems impossible to me to reconcile Robert Gore's insistence on two facts—that (i) he invented the process in October 1969 and (ii) he had no knowledge prior to October 1969 of stretching PTFE at the critical rate—with the solid facts in the record as to the prior operation of the 401 machine, except on the view that Robert Gore did not realize that he and others in the Gore shop had made his invention previously.

2. It follows that in October 1969 the invention of '566 would have been obvious under § 103 to Robert Gore because the prior practice of the 401 machine constituted prior art. Even if this was not prior art technically within § 102, that statutory provision "is not the *only* source of prior art." *In re Fout*, 675 F.2d 297, 300 (CCPA 1982, emphasis in original). The 401 machine was practiced under the '915 patent (issued to Wilbert Gore) and, whether or not Robert Gore subjectively realized what was happening, he and others in the Gore shop were practicing the invention later embodied in the '566 patent. That was prior art at least as to Robert Gore. *Id.* at 300–01.[7]

3. If it be thought necessary to invoke § 102 directly, in order to show anticipation, the record contains proof that the 401 machine was designed, constructed and used (just as described *supra*) in November and December 1968 and the early months of 1969—more than one year prior to the '566 patent application of May 21, 1970. *See* Jt.App. E 1199—E 1200. Section 102(b) therefore applies. Although commercial production was apparently not actively sought until June 1969, the practicing of the 401 machine prior to May 21, 1969 was "a public use" because the Gore company made "use of the device * * * in the factory in the regular course of business." *Connecticut Valley Enterprises, Inc. v. United States*, 348 F.2d 949, 952, 146 USPQ 404, 406 (Ct.Cl.1965).

4. Also, § 102(a)[8] applies here because Robert Gore was the inventor in the '566 patent and Wilbert Gore and others in the Gore shop were using the 401 machine before October 1969. Wilbert Gore (the inventor in the '915 patent under which the 401 machine was made and used) and the other employees are "others" within § 102(a)—they are not the same as Robert Gore who claimed to be inventor of the process that ripened into the '566 patent.[9] *See also* § 102(f), which would bar Robert Gore if he did not himself invent the subject matter of the '566 patent.[10]

5. The majority sustains the validity of claims 3 and 19 of the '566 patent (the claims also involved in appellant's suit for infringement) which are dependent on invalid claim 1. Because of the invalidity of claim 1 the only possible novelty in claim 3 would be the requirement that the rate of stretch would be about 100% per second, and the possible novelty of claim 19 would be that the final length would be greater than about five times the original length. My position is that both of these added elements, if novel, would have been obvious to persons of ordinary skill in the art.

The defect in the majority's analysis is that it neglects the cardinal fact that the prior art included the 401 machine (discussed *supra*), not merely the earlier patents assessed in the majority opinion. The 401 machine directly involved PTFE itself, not conventional thermoplastic polymers.

7. The District Court has found that there are no differences between claim 1 of the '566 patent and the processes previously used by the Gore firm to produce paste-extruded unsintered PTFE.

8. An invention is anticipated if it "was known or used *by others* in this country * * * * before the invention thereof by the applicant for patent" (emphasis added).

9. It is undisputed that it was Wilbert Gore who initiated the project for the 401 machine and watched over it.

10. The majority's discussion of "secondary considerations," though it is relevant to other aspects of this case, is irrelevant to the issue of anticipation raised by the 401 machine, and hardly persuasive as to the issues of obviousness based on or with respect to the 401 machine.

That machine also directly involved rapid stretching of PTFE at a rate markedly exceeding 10%. With this prior art of the 401 machine before him, an ordinary person skilled in the art would maximize stretch rate, if only to improve the machine's production rate. Cf. *In re Dwyer, Jewell, Johnson, McGrath, & Rubin*, 317 F.2d 203, 207, 137 USPQ 540 (CCPA 1963). Moreover, the very existence and operation of the 401 machine, which stretched PTFE rapidly without breaking, suggests to the skilled person the probability of stretching at even higher rates. Certainly, in the light of the 401 machine, skilled workers would see in at least the prior Markwood, Nash, and Scarlett patents (teaching extensive and rapid stretching of non-PTFE thermoplastics) the suggestion that the method of the 401 machine could also be used for comparable rapid and extensive stretching of PTFE.

6. In sum, I cannot escape the conclusion that—although there was no fraud proved—if the true facts as to the 401 machine had been made known to the PTO (as it requested), the involved claims of the '566 patent should (and probably would) not have been accepted.

MEDTRONIC, INC., and Med-Rel, Inc., Appellants,

v.

CARDIAC PACEMAKERS, INC., Appellee.

Appeal No. 83-820.

United States Court of Appeals, Federal Circuit.

Nov. 23, 1983.

The United States District Court of Minnesota, Edward J. Devitt, J., 555 F.Supp. 1214, held three patents relating to implantable cardiac pacemakers invalid, and not infringed. On appeal, the Court of Appeals, Markey, Chief Judge, held that: (1) claims 1, 8, 10, 11 and 12 of patent No. 3,391,697, relating to an implantable cardiac pacemaker that does not stimulate the heart above a predetermined rate were invalid as obvious; (2) claims 1, 4, 5, 7, 8, 9, 10 and 23 of patent No. 3,833,005, relating to an implantable digital programmable pacemaker were invalid as obvious; and (3) claim 13 of patent No. 3,901,247, relating to an implantable cardiac pacemaker having an easily interpreted indication of battery condition, was invalid as obvious.

Modified and affirmed.

1. Patents ⇐26(1)

There is neither a statutory distinction between "combination patents" and some other, never defined type of patent, nor a reason to treat the conditions for patentability differently with respect to "combination patents."

2. Patents ⇐324.60

Judgment in patent infringement suit was not so influenced by misstatement of law, that courts "should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements," so as to require reversal.

3. Patents ⇐112.1

Statutory presumption of a patent's validity is not weakened or destroyed where merely pertinent nonconsidered prior art is introduced; rather, offering party is more likely to carry burden of persuasion imposed by statute when art more pertinent than that considered is introduced. 35 U.S.C.A. § 282.

4. Patents ⇐112.1

A court may not merely "recognize" presumption of a patent's validity and then proceed to "satisfy" itself that the invention possesses such characteristics; rather, statute requires that court begin by presuming that invention has characteristics of